School of Information Systems

Developing a Four Phase Model: Thirty-Four Case Studies Exploring the Utilisation of Electronic Commerce in Australian Small and Medium Sized Enterprises:

A dissertation submitted to the

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by

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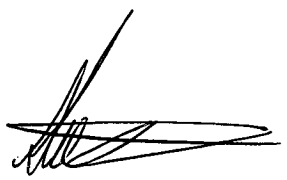

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Abstract

This thesis explores the utilisation of electronic commerce (e-commerce) amongst thirty-four Australian small and medium sized enterprises (SMEs). While e-commerce adoption amongst Australian SMEs is now well understood, there remains a lack of insight into how SMEs actively utilise e-commerce and the factors that influence their ability to derive benefit from this utilisation. Recently, a number of SME e-commerce models have emerged, although few of these have been grounded in the direct experience of SMEs utilisation of e-commerce. Through the conduct and analysis of thirty-four case studies this research develops a four phase model of e-commerce utilisation and business transformation. At the substantive level, these case studies, involve SMEs from two Australian States and represent a range of businesses from nine industry sectors: Agriculture, Mining, Finance, Retail Trade, Wholesale Trade, Hospitality, Education, IT/Communications and Manufacturing.

This research adopts a subjective ontology and employed an interpretative epistemology. The research strategy involved a qualitative research approach using multiple case studies that involved semi-structured interviews with owner / managers of SMEs located in Tasmania and Western Australia. Interview transcripts were analysed using a combination of qualitative data analysis techniques drawing on the principles of grounded theory and domain analysis. Both these methods utilise an inductive approach to theory generation whereby theories, concepts and models are derived directly from the data or grounded in the data. In presenting the data analysis of the case studies, three representative case studies are used to display in detail the depth of analysis conducted across all cases.

This thesis makes a number of contributions to information systems research into SMEs and e-commerce. At the substantive level by providing thirty-four SME qualitative case studies this research provides detailed descriptions of the utilisation of e-commerce amongst SMEs; identifies key factors that influence the ability of SMEs to derive benefit from e-commerce and increases the understanding of the direct experience of Australian SMEs utilising e-commerce. At the methodological level by combining two 'grounded' data analysis methods this research has been able to provide rich insight into the nature, significance and interrelationships amongst the data. Significantly by detailing an approach to combining grounded theory and domain analysis this thesis has contributed to the development of qualitative interpretative IS research methods for multiple case studies. At a theoretical level by generating a four phase model of e-commerce utilisation and business transformation this thesis has generated a conceptual framework extending information systems (IS) insights into e-commerce utilisation amongst Australian SMEs. It is anticipated that this framework will lead to further advances in Information Systems research in SMEs and technology utilisation.

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1. INTRODUCTION

This thesis explores the utilisation of electronic commerce (e-commerce) amongst thirty-four Australian small and medium sized enterprises (SMEs). Through the conduct and analysis of these case studies this research develops a four phase model of e-commerce utilisation and business transformation.

This chapter provides a summary of the background to this thesis and identifies the research objectives and research questions. It also highlights the contribution this thesis makes to the theory and practice of information systems (IS) research in the areas of SMEs and e-commerce. The first section of this chapter highlights the limitations of previous research on e-commerce and SMEs. A review of the literature reveals a lack of insight into how Australian SMEs utilise e-commerce. In this context, the second section outlines the research objectives and primary research questions. The section discusses the scope of this research on thirty-four SMEs located in two Australian States. The third section presents the contributions of this thesis to knowledge and practice in IS research. This section outlines contributions at the substantive, methodological and theoretical levels. The fourth section presents a review of the thesis structure outlining the remaining six chapters. The chapter concludes with a summary reflection of these four sections.

1.1 Background

The background to this research involves inter-related conceptual and practical concerns arising from research in three areas: SMEs, E-commerce and IS models. At the conceptual level definitional differences on how SMEs are classified, and how e-commerce has been defined has made comparisons of IS research on SMEs and on e-commerce problematic. Additionally, the tendency in IS to adapt models developed from research from large organisational experiences has often marginalised the significant differences between large and small businesses and how these differences impact on technology related business transformation. At the practical level, although e-commerce adoption amongst SMEs is now well understood, there remains a lack of detailed qualitative case studies into e-commerce utilisation in Australian SMEs. More specifically, there is little detailed understanding of factors that influence the ability of SMEs to derive benefit from e-commerce utilisation. The following sections discuss these research concerns in the three areas in more detail.

1.1.1 SMEs

In Australia SMEs are an important business group that contribute immensely to the country's economic and social prosperity however there is limited Australian research available that provides a deep understanding of SME business practices and their use of technology. Already in 1998-99 the Australian Bureau of Statistics estimated there existed over 1,051,500 small private sector businesses. This equates to 95% of all private sector businesses in 1999 employing 48% of all private sector employment (Australian Bureau Statistics, 1999).

Globally it is difficult to compare and contrast IS literature relating to SME research as there exists definitional differences across each region of the globe (Holmes & Gibson, 2001). In the United States firms employing up to 500 employees are considered to be a SME while in Australia firms employing up to

200 employees are generally defined as SMEs. These definitional differences highlight the difficulties comparing and contrasting the SME literature across regional locations. This also makes it extremely difficult to conduct cross regional research on the SME business group.

In the past organisational theorists believed that small businesses were similar to large businesses and that therefore application of organisational theory should be equally as relevant to small businesses. However subsequent research has highlighted differences between large and small organisations (Dandridge, 1979; Welsh and White, 1981; Delone, 1988; Thong, 1999) that have challenged these beliefs.

These differences between large and small businesses are particularly evident in the examination of small business technology adoption and utilisation. In this area, researchers have revealed at least six major factors influencing the adoption, innovation, management and successful use technology by SMEs. These factors include the role of management, strategic direction, available resources, technical complexity, IT knowledge and education and external issues (Cragg & King, 1993; Thong & Yap, 1995; Fuller 1996).

In this context, the application of existing IT and small business theory provides only a limited basis for examining the intricacies of SME e-commerce. Previous small business and technology research concentrated on the impact of technology on internal computing applications and systems. However the implementation of e-commerce extends beyond the application of technology in internal systems (Poon & Swatman, 1999). E-commerce has the capacity to transform not only internal practices but also the methods SMEs use to interact with their trading partners, associates and customers.

1.1.2 E-Commerce

With the advent of the Internet considerable business interest has been generated particularly with application of e-commerce technologies. The Internet and e-commerce has provided firms with an opportunity to conduct business electronically in a manner that is non-intrusive cost effective and accessible. For many businesses the decision to adopt various aspects of e-commerce makes a valid value proposition.

> "I strongly believe that in the future you will be able to measure the prosperity, or the failure, of small enterprise by their rate of adoption of e-commerce and its integration into their business strategies." (NOIE, 2001).

The judgment to incorporate some form of e-commerce becomes an astute business decision for those SMEs that can identify cost savings, better customer relationships and improved supply chain management and business growth in terms of productivity and wealth creation.

However the knowledge and understanding of e-commerce displayed by SMEs is varied and inconsistent. This is compounded by the plethora of different e-commerce definitions by individuals, academics, and industry. At the broadest level e-commerce is considered as 'doing business electronically' (Timmers, 1999:4) while others consider the nature of e-commerce to be context dependent. Kalakota and Whinston acknowledge four different dimensions of e-commerce: a

communications perspective; a business process perspective; a service perspective and an online perspective. The variety of e-commerce definitions creates a conceptual problem for conducting e-commerce research amongst individuals and businesses practicing e-commerce.

This study adopts Koshiur's (1997) definition of e-commerce.

> Electronic commerce is a system that includes not only those transactions that centre on buying and selling goods and services to directly generate revenue, but also those transactions that support revenue generation, such as generating demand for those goods and services, offering sales support and customer service, or facilitating communications between business partners (Koshiur, 1997:4).

The Australian government actively encourages and supports e-commerce initiatives (SETEL, 2001). The government has established a number of educational e-commerce initiatives and e-commerce incubator programs to promote the adoption of e-commerce among SMEs; these include the establishment of the National Office of the Information Economy (NOIE), Information Technology Online Grant program (ITOL), and incubator programs such as the Australian Electronic Business Network (AUSe.NET) and the Tasmanian Electronic Commerce Centre (TECC). Despite these activities SMEs continue to lag behind large businesses in their adoption of e-commerce (Small Business Index, 2001; NOIE, 2001; Wong & Turner, 2001).

The ability of large businesses to conduct e-commerce differs substantially from the capability of smaller businesses to implement e-commerce. SMEs are often disadvantaged by their ability to allocate resources and finance to new innovation and this is compounded by the lack of technical skills and knowledge (Cameron & Clarke, 1996; MacGregor *et al.*, 1998; Poon *et al.*, 1996; Corbitt *et al.*, 1997; Lawrence & Keen, 1997; Freel, 2000;). Even where the SMEs are capable of conducting e-commerce, research has highlighted they are often reluctant to so (Lawrence & Chau, 1998).

Although SMEs may be disadvantaged in their ability to conduct e-commerce, SMEs have traditionally been highly adaptive, innovative and agile within their competitive business environments (Levi & Powell, 1998). The Internet and e-commerce provides SMEs with an opportunity to attain a level of competitiveness in line with larger trading organisations (Ihlstrom & Nilsson, 1999). E-commerce differs from past implementations of IT in SMEs, rather than being simply a support tool, e-commerce has the potential be used as a strategic tool to develop new organisational infrastructures, business relationships and value chains.

Initial research on SME e-commerce has focused on identifying and exploring the factors that affect the adoption of e-commerce and the potential benefits derived from e-commerce (Abell & Lim, 1996; Lymer & Johnson, 1997; Poon & Swatman, 1996; 1999). The slow uptake of e-commerce by SMEs has been observed and subsequent research determining the factors that inhibit e-commerce adoption has also been explored (Lawrence & Keen, 1997; Tan & Teo, 1998; Tan & Konstapel, 1998; Purao & Campbell, 1998; Corbitt *et al.*, 1997; Carroll 1999). Other studies noted the drivers for e-commerce highlighting factors internally

within the organisation and externally in the business environment (Poon & Swatman, 1997).

To date, there is a lack of empirically grounded heuristic IS models in the literature that depict the actual utilisation of e-commerce by Australian SMEs. Emergent models and frameworks that began to appear in the literature were often unsubstantiated or lacked empirical validation. There is a need amongst the IS research community, practitioners and government for a set of e-commerce models that have been grounded in the experiences from SMEs actively utilising e-commerce.

1.1.3 IS Models of IT/EC related Business Transformation

The development of early models and frameworks relating to IT/EC business transformation was based on the experiences and knowledge gained from large business. Researchers have previously adapted established IS models such as Davis's (1989) Technology Acceptance Model (TAM), Rodger's (1995) Diffusion of Innovation Model, Nolan's (1973) Stage of Growth Model and Porter's (1985) Value Chain Model to examine IT/EC related business transformation among smaller businesses. However the adaptation of these models for SME research is often inappropriate and problematic for modelling the use of technology by SMEs.

The demand for new theoretical and practical IS models that can further our understanding of new emergent technologies applies equally to both small and large businesses. The opportunities to integrate e-commerce technologies challenge existing business practices. (Bloch *et al.*, 1996; Dalton, 1999; Viehland, 1999). Burgess and Cooper (1999) reviewed thirteen e-commerce business models derived from large business e-commerce experiences. They concluded that although the models demonstrated similar components, they were "not mutually exclusive". Their analysis determined that the business models could be categorised into two collections. That is, e-commerce models reflecting an adaptation or extension of existing IS models or new successive models replacing traditional business exemplar. The initial e-commerce models that emerged in the IS literature were often generic in nature and offered little insight into the use of e-commerce by SMEs.

Unlike large organisations, the e-commerce activities of SMEs are constrained by their usually insignificant influence on the value chain and industry circles. They are typically resource poor and have traditionally used IT as a support mechanism as opposed to an entrepreneurial tool (CEC, 1996). Although most significant IS theory and models have been developed from the study of large organisations some IS models and theories have been aptly applied to smaller organisational studies. These include Venkatraman's (1994) "IT-Enabled Business Transformation Model".

Early SME e-commerce research focused on factors affecting the adoption of the Internet. Subsequent research on SMEs proposed a series of conceptual models of e-commerce maturity (KPMG, 1997; Poon & Swatman, 1997a; Grant, 1999). There is however, a lack of a substantial body of theory that improves the understanding of relationships beyond the adoption of e-commerce technology to

include concepts, theories and models addressing the utilisation of e-commerce by SMEs.

There is a need in IS for alternative developments of theoretical and methodological approaches to investigate e-commerce utilisation amongst SMEs that are based on the experiences and knowledge relating specifically to SMEs. This thesis develops a conceptual four phase model of e-commerce utilisation that is grounded in the experiences from Australian SMEs. The next section discusses the research problem and objectives of this thesis. An outline of the research question and scope of the study is also presented in the following section.

1.2 The Research Problem

Researchers have established that small firms are not like large business. It has been considered inappropriate to use IS models derived from large organisational observations and experiences to explore the application of technology in small firms. Small business technology research has previously focused on the use and adoption of IT within the firm. However adapting or extending previous small business technology research to explore the use and benefits of e-commerce provides limited opportunities to investigate the potentially broad impact of e-commerce amongst SMEs. The potential benefits of e-commerce extend beyond the internal boundaries of SMEs potentially influencing trading relationships and interactions with external entities beyond the physical scope of the SME.

It is problematic that the definition of SMEs is not standardised at a global level. It is conceivable that a business classified as an SME in North America may be categorised as a large organisation in the European and Australian context. This definitional problem also extends to the meaning of e-commerce. The term e-commerce has a number of contextual dimensions and lacks a standard meaning among individuals, academics and business. These definitional dilemmas, make it difficult for IS researchers to compare SME research across regional boundaries and examine the e-commerce activity conducted by firms categorised within SMEs classification.

The existing IS models of SME e-commerce activity has previously focused on e-commerce adoption and implementation factors. Models that have emerged examining the use of e-commerce are adapted and/or are extensions of previous IS models. These models are often conceptual models that have not been empirically tested or grounded in the SMEs experiences and attitudes and opinions of individuals actively utilising e-commerce.

The lack of substantive IS research examining the use of e-commerce by SMEs has been problematic in the past. To date, particularly in Australia, there is a lack of rich detailed qualitative insight into how SMEs utilise e-commerce and the factors that affect the ability of SMEs to gain benefit from this utilisation. This thesis develops a conceptual model of e-commerce utilisation that is grounded in the experiences from thirty-four case studies on Australian SMEs actively using e-commerce.

1.2.1 The Research Objectives

A review of the IS literature indicates that there has been limited Australian case study research into the utilisation of e-commerce by SMEs. The IS discipline lacks an essential body of theory that addresses the utilisation of e-commerce among SMEs particularly within the Australian context. The purpose of this thesis is to contribute to the IS discipline a substantive examination of the utilisation of e-commerce amongst thirty-four Australia SMEs. The research aims to satisfy the following objectives, namely to:

- Identify why these Australian SMEs are using e-commerce.
- Determine how these Australian SMEs are using e-commerce.
- Investigate the impact of e-commerce on these businesses.
- Discover what factors affect the utilisation of e-commerce.
- Detect possible problems associated with using e-commerce.

1.2.2 The Research Question

In order to fulfil these objectives two research questions have been formulated.

The first research question is as follows:

RQ1: *What is a suitable framework to explore the utilisation of electronic commerce amongst SMEs in Australia?*

The second research question asks:

RQ2: *What factors influence the utilisation of electronic commerce amongst Australian SMEs?*

1.2.3 The Research Scope

In order to address the research questions the scope of the research involved selecting and locating suitable case study participants. The methods used for data collection and the analysis of the data was an important consideration. This section discusses various aspects of the research scope.

The Selection of the Participants

Finding a selection of SMEs actively engaged in the utilisation of e-commerce proved a difficult task initially. When the research started it was hard to identify those SMEs that displayed an active use e-commerce. Three methods were employed to find a range of SMEs using of e-commerce. An initial search of online business indexes revealed a number of SMEs utilising e-commerce. An inspection of web developer's web-sites provided a showcase of e-commerce clients and finally discussions held with web developers also provided a list of recommendations of other potential users of e-commerce.

The Location of the Participants

Thirty-four case study participants were from two States in Australia. A total of eighteen Tasmania and sixteen Western Australia SMEs were included in the study. These SMEs represent a collection of micro, small and medium sized enterprises actively utilising e-commerce.

Data Collection Methods
Face-to-face interviews were conducted with owner/mangers of each case study. A semi-structured question frame was employed to gain data about the SMEs' experiences and participants' views and meanings concerning the utilisation of e-commerce. The structure of the question frame gathered details about the SMEs business background, their current use of e-commerce, the impact and changes to the business as a result of using e-commerce and any problems that have been incurred from the utilisation of e-commerce.

Techniques used for Data Analysis
Each interview was transcribed for data analysis. A series of coding procedures based on the principles of grounded theory (Glaser & Strauss, 1967) were applied to simplify and manage the individual case data. The initial data analysis was complimented by a second qualitative data analysis technique, called domain analysis (Spradley, 1979), which provides a deeper insight into the interrelationships concerning the utilisation of e-commerce and a mechanism for a cross comparative analysis of all case studies. The combined approach to data analysis leverages the strengths of grounded theory and domain analysis to reveal the conceptual complexity in the data and to highlight the semantic relationships that exist within and between the data.

1.3 Justification for this PhD study

The thesis provides three levels of contribution to IS discipline. At the level of research practice the thesis provides an in-depth study of thirty-four Australian SMEs actively utilising e-commerce.

- Thirty-four SMEs from two States of Australia: Tasmanian and West Australia are examined to reflect the different types of e-commerce utilisation by micro, small and medium sized enterprises.

At a methodological level the thesis provides an innovative approach to qualitative data analysis. The research develops a methodological framework that incorporates the qualitative vigour of grounded theory and domain analysis to explore the rich multi faceted case study data.

- The two qualitative data analysis techniques apply an inductive approach to theory generation where theories, concepts and models are directly related to the data or grounded in the data.
- The open, axial and selective coding practices reflecting the principles of grounded theory are deployed to condense the large volume of qualitative data and to distil key concepts and themes embedded in the data.
- The use of domain analysis extended the initial data analysis by distinguishing the inter-relationships and semantic relationships that exist within and between the emergent concepts and themes across all cases. The role of domain analysis is to extract rich detailed information about the experiences of using e-commerce in relation to the research objectives and questions.
- The combined approach to data analysis generates a finer granularity of analysis of SMEs utilisation of e-commerce.

At a theoretical level the thesis develops a framework exploring the utilisation of e-commerce among SMEs. This thesis provides a set of alternative IS models and a conceptual framework that expands the existing collection IS exemplars.

- The development of an *initial* four phase model of e-commerce utilisation among SMEs.
- The development of a four phase model of SME e-commerce business transformation.
- A four forces model that acknowledges the range of factors that influence the ability for SMEs to conduct e-commerce and business transformation.
- The four phase model of e-commerce utilisation and business transformation reflecting the influence of internal and external factors.

It is envisaged that this thesis will provide useful insights for future IS research exploring the use of e-commerce by SMEs. The next section provides a summary of the remaining chapters. In keeping with the interpretative research approach each chapter concludes with a section providing a summary reflection of the highlights of each chapter.

1.4 Chapter Summary

Chapter 2:
Chapter 2 provides a review of the literature pertinent to the research. The chapter presents literature relating to SME e-commerce prior to data collection. There exists a substantial body of literature concerning factors that affect the adoption of the Internet and e-commerce by SMEs. A discussion of potential e-commerce benefits, inhibitors and opportunities has been well reported by researchers. Subsequent to data collection, a number of SME e-commerce models have emerged however many of these are yet to be validated. The issues surrounding the adoption and implementation of e-commerce remains an area of interest and emergent e-commerce maturity models are gaining attention. The initial review of the literature substantiates that IS research lacks a substantive number of SME e-commerce models and theories that have been empirically validated.

Chapter 3:
Chapter 3 of the thesis describes the research methods used to conduct the study. The research approach is based on a subjective ontology with an interpretative epistemology utilising qualitative research methods. A multiple case study strategy was used encompassing thirty-four case studies located in two States of Australia. Semi-structured interviews were conducted with the owner/managers of various businesses of the thirty-four SMEs. The interviews were generally carried out as face to face interviews however in a few instances the interview was conducted over the phone. The interviews were tape recorded and transcribed for future analysis. Notes were taken with interviews conducted over the phone. Two data analysis techniques are used to analyse the data. The first part of the data analysis was conducted using a high level grounded theory approach to extract the key emergent themes from the data. The second part of the data analysis utilised domain analysis techniques. The domain analysis technique provided a rich detail methodology to explore the inter-relationships between the themes across the cases.

Chapter 4:
Chapter 4 provides an overview of the first part of the data analysis. The first part of data analysis utilises a high-level grounded theory coding procedure to reveal the emergent themes and constructs from individual case studies. Three representative case examples are used to illustrate the coding process that was applied to the thirty-four case studies. The high-level grounded theory analysis of the data revealed twenty-four core codes and an extra fifty-four associated codes. An overview of all the emergent categories are presented towards the end of the chapter.

Chapter 5:
Chapter 5 continues to analyse the data using domain analysis techniques. Domain analysis offers an in-depth analysis of the concepts and themes revealed in Chapter 4. The relationships between the core codes and associated codes are explored in detail providing a rich insight into the semantic relationships that exist within and across all thirty-four case studies. The chapter highlights the domain analyses of three representative case examples, which are mapped against each of the research objectives of the study.

Chapter 6:
Chapter 6 provides an interpretation and discussion of the complete data set. The interpretation of the data draws upon the data analysis presented in Chapter 4 and the domain analyses completed for each case in Chapter 5. The interpretation of the data analysis forms the basis for the development of a set of e-commerce models that are presented in the chapter. Initially a four-phase model of e-commerce utilisation is presented which forms a base for subsequent SME e-commerce models developed in this chapter. A second model of e-commerce utilisation by SMEs is proposed by expanding the initial four-phase model. This model adapts the work of Venkatraman (1994) to provide another conceptual model exploring the relationship between organisational transformation and potential benefit derived from e-commerce. Further analysis of the inter-relationships found in the data leads to a refined model, The *Four Phased Model of E-commerce Utilisation and Business Transformation.* The chapter concludes with a discussion of the findings in relation to emergent IS literature subsequent to data collection, which relates to SME e-commerce.

Chapter 7:
Chapter eight outlines the conclusions of this study. A review of all major findings is discussed along with an outline for future work in this emergent research area.

1.5 Summary Reflections of the Chapter

This chapter has provided a background summary to this thesis. It identifies the objectives of the research and highlights the research questions of the study. The chapter discusses the contribution this thesis provides to the theory and practice of IS research in the areas of e-commerce and SMEs.

A review of the limitations of previous research on SME e-commerce forms the background to this study. Prior to data collection, the IS literature lacked

significant insight into the actual use of e-commerce by SMEs. Within Australia, a review of the literature revealed a lack of detailed insight into how Australian SMEs utilise e-commerce.

In this context, a set of research objectives and primary research questions were presented in the chapter along with a discussion on the scope of the research to explore the utilisation of e-commerce among thirty-four SMEs in two Australian States.

This chapter outlines three levels of contributions the thesis provides to the knowledge and practice in IS research at a substantive, methodological and theoretical level. The chapter concluded by providing a summary review of the thesis structure outlining the remaining six chapters.

In the next chapter a review of the IS literature is presented which formed the basis for developing the research objectives and research questions. The literature presented in the next chapter reflects the literature relating to SME e-commerce prior to data collection. A review of the e-commerce literature that emerged after data collection is examined and discussed in Chapter 6 in the context of the four phase model.

2. LITERATURE REVIEW

2.0 Introduction

This chapter presents an overview of the research literature relating to SME e-commerce prior to collection of the data. The purpose of this literature review was to explore the existing IS data surrounding the research area.

- The first section provides a background of e-commerce activities in Australia. This section discusses the importance of e-commerce to the Australian economy and the initiatives instigated by the Australian government to encourage and support e-commerce activities by SMEs.
- The second section discusses the lack of a standard e-commerce definition and the implication this has for researchers working in this area.
- The third section outlines the differences between large organisations and small businesses. The appropriateness of using large organisational theory for smaller organisations is explored.
- The fourth section reflects on previous IS models that have been used to examine the adoption and diffusion of technology by organisations. A range of IS models are explored and their implications to this study are discussed.
- The fifth section examines the nature of small and medium sized businesses.
- The sixth section reviews the literature concerning small business and IT. Previous research involving small business has been focused on the adoption and use of IT however the application of small business IT theory to SME e-commerce needs careful consideration as e-commerce differs to IT.
- The seventh section provides a review of IS research in SME e-commerce prior to data collection. This section discusses a range of factors that influence the adoption of e-commerce, the perceived benefits derived from e-commerce and the relative competitive advantages and opportunities relating to SME e-commerce.
- The eighth section reviews the literature concerning the utilisation of e-commerce prior to data collection. The section explores the emergent use of e-commerce by SMEs. Researchers reported a range of e-commerce applications however the level of sophistication of these e-commerce activities was relatively minor.
- The ninth section discusses emergent models of e-commerce adoption and utilisation by large and small organisations. Prior to data collection the number of SME e-commerce models within the Australian context was comparatively small. This further justified the need to establish IS models that specifically addressed the utilisation of e-commerce by SMEs.
- The tenth section provides an insight into the IS e-commerce models that have surfaced since collecting the data. The e-commerce models relating to the use of e-commerce by SMEs are introduced in this section but are explored in detail in Chapter 6, where the models are compared and contrasted against the findings of this research.

The final section of the chapter provides a summary reflection of the key elements of this chapter.

2.1 Background

As we enter the new millennium the conventional methods of conducting business are set to change forever. The effects of competition and globalisation of many of the world's economies have motivated businesses to re-evaluate business strategies internal and external to their organisations. For many, conventional business practices are too rigid unable to cope with the new threats, problems and competition posed by the digital economy. The solutions to these new problems may in part be found in the integration of electronic business philosophies. The integration of electronic business into the organisation requires organisations to understand and determine how, when and where e-commerce may be used (Kalakota and Whinston, 1996).

In Australia, SMEs form a substantial part of the economy, making up more than 95% of all enterprises and accounting for more than 50% of private sector employment, within Australia there are almost one million small to medium businesses (NOIE, 2001). Numerous studies have highlighted the benefits of e-commerce for SMEs including global reach (Hughes *et al.,* 1998), equalising the business environment (Whinston *et al.,* 1997), cost savings and increased productivity (Burgess 1998).

In 1999, Australia was viewed by the OECD as leader in e-commerce initiatives among 29 of its member countries. The Australian government recognised the importance of e-commerce and deemed it significant to encourage all organisations large and small to explore the use of e-commerce. Consequently, the government initiated a number of e-commerce programs specifically aimed at encouraging Australian SMEs to adopt e-commerce. Initially these included the formation of the National Office of the Information Economy (NOIE) promoting programs such as the Australian Electronic Business Network (AUSe.NET), the Information Technology Online Grant program (ITOL) and the Tasmanian Electronic Commerce Centre (TECC). As a result of the interest and demand for information regarding e-commerce, there has been a plethora of research conducted in all areas of the e-commerce, however prior to 2000 there remained little research into the *utilisation* of e-commerce by SMEs particularly in the Australian context.

Historically there is a vast amount of literature that has explored the use of IT within large organisations and smaller businesses. With the advent of the Internet, interest surrounding the Internet and e-commerce technologies has attracted significant research attention. The interest in e-commerce research continues into the new millennium. This is reflected by the increased numbers of e-commerce related articles published in leading IS journals and the establishment of academic journals specifically publishing e-commerce literature. In 2002, Bharati and Tarasewich (2002) cited over sixty journals that currently publish e-commerce research.

The Internet is found to provide a platform that is readily accessible and cost-effective forming a convenient global information and communication infrastructure (Poon and Swatman, 1996). The acceptance of the Internet as a global business tool has generated commercial interest in e-commerce as a viable alternative for sharing business information within organisations and between

business associates. Within Australia it has been reported that already by 1997 over one billion electronic transactions had taken place (DIST, 1998). The Small Business Index (2001) observed the largest rise in Internet connections since the first *Index* started to record the issue in 1995. Connections to the Internet have increased from 60% to 75% connection rate for small businesses and 89% to 95% for medium businesses.

The application of e-commerce has altered the conventional manner in which business is conducted. The global commercialism of the Internet and WWW has created a vacuum of e-commerce support from all business sectors. The demands and expectations of the online market place require organisational strategies that can change and meet customer requirements in a timely and competitive manner. Conventional organisations need to be in a position to alter their traditional business models and be flexible enough to introduce new electronic business systems to enable to trade in the business environment of the new millennium.

The interest in e-commerce by large organisations prompted significant interest in e-commerce research to explore the value of e-commerce, factors contributing to the adoption of e-commerce and the identification of inhibitors and barriers to e-commerce.

The review of the literature prior to data collection suggests a lack of substantial theory in the IS literature that has been empirically validated exploring how SMEs are currently using e-commerce and identifying factors that affect their utilisation e-commerce. An objective of this study is to gain an insight into the issues that affect SMEs ability to utilise e-commerce.

2.2 Defining E-Commerce

There exists a multitude of e-commerce definitions for the term "electronic commerce" and some believe that the term is often misapplied (Mougayar, 1998). The field of e-commerce research has increased as the IS research discipline expands into a multitude of areas. Consequently the definitions for e-commerce varies contextually across the different dimensions of e-commerce research.

Within in the IS discipline there exists no clear, concise definition for the terms e-commerce, e-business and Internet commerce. In essence these terms have been used interchangeably at times. In recent years researchers (McKay *et al.*, 2000) are beginning to acknowledge a distinction between these terms but there is still no consistent definition of e-commerce across the discipline and within the commercial world OECD (1999). Within Australia the definition of e-commerce from a SME perspective still remains a subject of debate (SETEL, 2002)

When this study began the amount of literature specifically focusing on the use of e-commerce and the Internet by Australian SMEs was relatively minor. For the purpose of this study the thesis considers the terms e-commerce, e-business and Internet commerce to share similar meanings as they collectively signify the conduct of business over electronic networks especially in the context of SMEs.

Pioneering e-commerce researchers Ravi Kalakota and Andrew Whinston (1996:3), acknowledge that it's difficult to define e-commerce as one particular

statement. They state that e-commerce can be considered from four perspectives; a communications perspective, a business process perspective, a service perspective and an online perspective.

- From a communications perspective, electronic commerce is the delivery of information, products/services, or payments via telephone lines, computer networks, or any other means.
- From a business process perspective, electronic commerce is the application of technology toward the automation of business transactions and workflows.
- From a service perspective, electronic commerce is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.
- From an online perspective, electronic commerce provides the capability of buying and selling products and information on the Internet and other online services.

Kalakota & Whinston (1996) presents four broad views of e-commerce which are distinct and but valid. However others researchers consider a broader e-commerce definition, such as Timmers (1999: 4) who defines e-commerce as "doing business electronically" broadly encompassing all types of electronic business.

David Koshiur (1997:4) proposes a definition of electronic commerce that lies in between the two previous definitions. He defines e-commerce as;

> Electronic commerce is a system that includes not only those transactions that centre on buying and selling goods and services to directly generate revenue, but also those transactions that support revenue generation, such as generating demand for those goods and services, offering sales support and customer service, or facilitating communications between business partners.

All these definitions described here are extremely broad. The large number of definitions that exists for e-commerce creates a problem of definitional confusion. The confusion that is associated with defining e-commerce exists not only among researchers of e-commerce but also among individual conducting e-commerce. This confusion is compounded further when e-commerce is discussed across different tiers of businesses; large corporations, governments and small businesses. In each case, e-commerce means something different for each of these groups.

In this study, the term electronic commerce follows adapts Koshiur's (1997) definition. That is e-commerce includes all transactions conducted over electronic networks that directly generate revenue and also other transactions that support the generation of revenue. Where transactions can include the buying and selling of goods and products as well as transactions to support marketing activities, communications and customer service and business relationships between consumers and business associates.

2.3 Large versus Small Business

Researchers have long acknowledged the disparity between large and small businesses (Cohn & Lindberge, 1972; Dandridge, 1979; Thong & Yap, 1995; Welsh & White, 1981). However the disparity between large and small business may be potentially reduced with the strategic use of e-commerce. The ability of SMEs take advantage of e-commerce to formulate sophisticated trading hubs and partnerships may provide a means to narrow the gap between large and small businesses in the information age.

Historically, the implementation of e-commerce by SMEs has occurred as a response to requests from large organisations. SMEs were often coerced into adopting early e-commerce technologies to retain their trading relationships with major customers. Early adopters of e-commerce discovered the costs associated with adopting e-commerce technologies prohibitive especially where more complex forms of e-commerce, such as EDI were applied (Goldsworthy, 1997).

SMEs have unique characteristics that segregate them from large organisations, these include been resource poor, lacking trained personnel, sensitive to a volatile competitive environment and have short term management outlooks (Welsh & White 1981). Small businesses in particular, are likely to be younger and more susceptible to been taken over or cease trading as they grow. They have less formal business structures in place and are sensitive to movements in the marketplace. The lack of formal business processes in small business can make it difficult for them to identify opportunities to automate practices using IT. The implementation of new technology and changes to the operation of the business need to be low risk. These factors contribute to the diversity between large and smaller business in their ability to uptake e-commerce.

It is essential for small businesses to manage their cash flow (Welsh & White 1975) as they are susceptible to seasonal variations in sales which, unlike large organisations have the ability to draw on cash reserves or small loans to adjust against season fluctuations. The ability of small businesses to recover from business mistakes or misjudgments is significantly reduced compared to large business.

However, aside from obvious distinctions based on size, turnover and resources, SMEs have traditionally exhibited adaptability, innovation and agility (Levi & Powell, 1998). These are the very attributes that large businesses have strived to obtain by formulating virtual organisations or by engaging in web-based commerce (Poon & Swatman, 1998). This suggests that SMEs are well positioned to harness major productivity gains from the global arena by exploiting their ability to be flexible, dynamic and agile in the new web base economy (Malone, 1985; Montazemi, 1988; Kaplan *et al.*, 1997). With the advent of the Internet and e-commerce these small businesses can readily harness the potential power of e-commerce to project a level of competitiveness envied by large trading corporations.

The introduction of e-commerce technologies differs from past generations of information technology (Grant, 1999). SMEs can gain substantially from the use

of e-commerce through the provision of new infrastructures that enabled SMEs to compete on equal basis as larger organisations (Ihlstrom & Nilsson, 1999). SMEs possess flexible organisational structures and adaptable decision making processes providing commercial advantages beyond the reach of many large organisations. Unfortunately SMEs have scare technology and human resources and are not likely to invest in new technology unless there is scope for immediate returns on the investment (Ihlstrom & Nilsson, 1999).

The costs of adopting and implementing new technology are dramatically reduced compared to a decade ago. The diffusion of technology in business and in the general household of develop countries, open up new market opportunities never experienced before. The potential for small business to compete with large business on equal terms is a realistic possibility.

The potential for SMEs to use e-commerce to build partnerships and associations suggests that SMEs can gain as much from e-commerce as large organisations if not more (Schwartz, 1997). The notion of virtual organisations facilitated by e-commerce is gaining increase interest particularly with regards to the virtual organising practices among small businesses. But the first challenge is to encourage the participation of e-commerce among SMEs. New opportunities for SMEs adopting e-commerce increase as the interest in the Internet grows. However the actual uptake of e-commerce technologies by SMEs still remains slow.

In a study by Haynes *et al.*, (1998) a comparison of Internet usage by small, medium and large corporate comparison suggested that there was no significant difference in Internet usage however medium sized firms were the least likely to use a web site. The perceived slowness in adopting e-commerce, in comparison to small business and large business, may indicate that medium sized organisations were at a competitive disadvantage if they did not consider adopting the Internet in a more meaningful manner. Small business embracing e-commerce quickly have the potential to disintermediate mid-sized businesses exerting further competitive pressure on medium businesses.

In the past the development of organisational theory literature has been founded by studies of large corporate organisations. Former organisational theorists believe that small businesses are like large businesses and organisational theory should apply equally as well for small businesses as large organisations. The application of these theories to smaller businesses was not often appropriate (Thong & Yap 1995). It is suggested that IT is a resource that can enable small businesses to behave like large organisations (Porter & Millar, 1985).

However the application of large-scale organisational theory can inevitably end in disastrous consequences for small businesses (Allen, 1971). The assumption that organisational theory developed from large organisations should equally fit with small business was common premise in the early development of organisational theory (Dandridge 1979). Similarly it was thought that for management in small business to succeed they should adopt the principles of as large business but on a smaller scale (Welsh & While 1981).

Fundamental differences between smaller organisations and large corporate business do exist (Dandridge 1979; Welsh and White 1981; Delone 1988; Thong 1999). There is a need for further research that specifically addresses SME business structures providing an alternative to large organisational theory.

2.4 Existing IS Models of IT/EC related Business Transformation

Previously a range established IS models have been adapted to explore the adoption and use of IT in smaller organisations. A number of IS models have been developed to examine and explore the role of technology within the workplace. Amongst these models a few have proved popular by IS researchers to explore the diffusion and uptake of technology. Behavioural decision theories from social psychology provided a basis for IS researchers exploring the issues of IT adoption and utilisation by individuals. Most notable are the *Theory of Reason Action (TRA)* developed by Ajzen and Fishbein's (1980) and an adaptation of the model by Davis (1989) the *Technology Acceptance Model (TAM).*

- *Theory of Reasoned Action (TRA)*

The *Theory of Reason Action* was a theory developed by Fishbein and Azjen (1975) which was subsequently revised by to the *Theory of Planned Behaviour* Azjen (1991). These intention models have been widely accepted in IS, The theory proposed by Fishbein and Azjen is useful to predict and describe the behaviour of individuals during the a decision making process. This theory provides a plausible foundation for developing theory for technology adoption and utilisation. The *Theory of Reasoned Action* was subsequently adapted and refined over subsequent years by Davis (1989) and Davis *et al.*, (1989).

With regards to small business IT adoption, researchers Thong and Yap (1995) support the theory of reason action in their study of 172 small businesses. Their study concurs with the theory that the intention of an individual to behave in a certain manner is influenced by his or her attitude towards the behaviour (Fishbein & Azjen, 1975). The study found that owners/managers were willing to advocate an IT project if they thought that the business would derive some advantage or benefit economically.

- *Technology Acceptance Model (TAM)*

Davis (1986) adapted of the TRA model to develop a model of technology acceptance based on two factors, perceived usefulness and ease of use. Davis's TAM model has been used extensively to empirically investigate end users beliefs, attitudes, implementation and usage behaviours of technology (Delone, 1988; Igbararia *et al.*, 1996; Steer *et al.*, 2001). The model has been used empirically to explore the use of a range of desktop and communication technologies (Elkebrokk and Sorebo, 1998). But not all studies have found the TAM model to be conclusive. In some cases it has been reported even where the technology was regarded positively, the technology received little use at all (Moore & Benbasat, 1991). Elkebrokk and Sorebo (1998) suggest the model does not distinguish between an individual faced with one technology or a multiple choice of similar technologies. Other researchers (Steer *et al.*, 2001; Sharma & Yetton, 2001) question the suitability of TAM to model the adoption of web based

technologies because in the context of the online environment many additional variables come into affect.

- *Rogers' Diffusion of Innovation Model*

Rogers (1995) developed a stage approach to the diffusion of innovation within organisations. He identified four stages of innovation; *knowledge, persuasion, implementation and confirmation.* The *knowledge* stage reflects the time an individual is exposed to an innovation and gains time understanding its application and potential. The *persuasion* stage occurs when an individual started to form an opinion about the innovation either it be favourable or unfavourable. If opinion is favourable the next stage of *implementation* is likely to occur where the innovation is used. The final stage of diffusion involves a period of evaluation, in the *confirmation* stage the innovation is either adopted or rejected.

- *Nolan's Stage of Growth:*

Nolan's (1973) stage of growth model reflects on an organisation's acceptance of a particular technology. The model was subsequently revised to include six stages of computer use in organisations. The model indicates a relationship of time versus costs for each stage of technology growth. These six stages were identified as; *initiation, contagion, control, integration, data administration* and *maturity* (Nolan, 1979). The model can represent different organisations using the same technology at the same time but at different stages. An organisation may be portrayed as having different technologies implemented at each stage. The time each organisation spends at each stage may differ depending on how important or comfortable an organisation is with the new technology. It has been suggested that Nolan's model (1979) would be useful to test on small businesses but no studies have been reported (Cragg & King, 1993). The model has been widely cited in the IS literature however some researchers have criticised the use of the model (Benbasat *et al.* 1984, King & Kraemer 1984; Farhoomand 1992).

- *Porter's Value Chain Model*

Porter's (1985, 1990) value chain model suggests that an organisation can enhance its competitive positioning by performing key internal activities in the value chain at a lower cost and better than its competitors. The model breaks the activities into primary and secondary actions. Primary actions include major activities as production, marketing, sales, logistic and customer service. The secondary activities are those activities that support the primary activities that may include the use of technology, human resources management.

The model influenced the thinking of IS practitioners and business executives since it's introduction in 1985. However, Stabell and Fjeldstad (1998) suggest that a growing number of businesses have found that the value chain model does not fit the reality of their industry sectors. They propose that two new models of value creation are appropriate: *value shops* and *value networks*. The value shop is a model for solving problems while value networks is a model for mediating exchanges between customers. These models utilise a distinct set of core activities to create and deliver different forms of value to customers.

- *McKinney, MacFarlane & Cash Strategic Grid*

The strategic grid developed by Cash, McFarlan and McKenny's (1983) is useful to outline the strategic use of IT within an organisation. The grid depicts the various levels of strategic use of IT by organisations. The strategic grid reflects four levels of strategic usage of IT. At the lowest level IT is represented as providing *support* to the organisation. The *turnaround* phase exists when information derived from IT systems is used to provide strategic information. The *factory* phase represents a stage where IT is integral to the operation of the business and the final *strategic* phase depicts where the business relies on IT for it's survival. The development of the strategic grid offers an insight into the strategic use of IT however the application of the model for smaller businesses like SMEs required further validation.

The IS exemplar that has been discussed so far formed an IS conceptual environment in which e-commerce models started to emerge. Past IS models have been used by IS researchers to explore the technology adoption and utilisation amongst businesses large and small. However there remains an over concentration on large businesses that does not acknowledge SME differences. Small business is different from large business and the use of IT differs to that of e-commerce. Although the appropriateness of past IS models have been clarified by some researchers (Galliers & Sutherland, 1994) there still exists a gap in IS literature for IS models and theory that specifically addresses the use of e-commerce by SMEs.

The e-commerce *paradigm* is a new and emergent business phenomena (Fingar *et al.*, 1999). Little theory has been generated from current e-commerce research. The parallels between IT and e-commerce are evident however the use of IT and e-commerce differ substantially. Traditionally IT has been and continues to be used as a business support tool. The strategic value of IT is not readily identified when IT is introduced within the organisation but this draconian view of IT is changing dramatically (Kalakota & Whinston, 1996). The use of e-commerce differs substantially from IT, the primary driver for e-commerce lies in it's perceived strategic value to the business. Organisations seek value from e-commerce as alternative means to conduct business transactions, communications, marketing, supply chain and customer management. A detailed review of initial e-commerce research is presented in detailed in section 2.7.

2.5 The Nature of Small and Medium Sized Enterprises

In view of the fact that SMEs frequently constitute more than 90 percent of the total number of businesses in most developed countries (OECD, 1999) the success of small business has a direct impact on the national economy (DoCITA, 1998). SMEs are a key provider of employment and commercial innovation and a significant contributor to GNP (Lymer and Johnson, 1997; Poon & Swatman, 1998; Purao & Campbell, 1998).

Already in 1998-99 the Australian Bureau of Statistics estimated over 1,051,500 small private sector businesses. SMEs form a substantial part of the economy, making up more than 95% of all enterprises and accounting for more than 50% of private sector employment within Australia (NOIE, 2001). However SMEs are

faced with a range of issues that make it difficult to survive in this dynamic, high risk and competitive business world (DoCITA, 1998).

The pressure faced by all small businesses to survive in their business environment is at times overwhelming. The level of risk is magnified when we examine micro businesses. Typically micro businesses are classified as sole traders or partnerships. The organisational structure is flat with business decisions stemming directly from the owner/managers. Often family members are employed in the business, as is the case with seven of the business participating in this study. Micro businesses seldom survive misjudgments and have to be careful how they utilise their limited resources (Chappell & Feindt, 1999). E-commerce has the potential to improve the SMEs' productivity and efficiency, while enabling them to access international markets previously constrained by geographical boundaries (Goldsworthy, 1997).

SMEs include a wide diversity of businesses that span across all industries. In the Australian context SMEs can be defined as micro businesses, small businesses and medium sized businesses. The Australian Bureau of Statistics (Australian Bureau of Statistics, 1999) defines SMEs as a business group comprising of:

- Micro businesses employs less than 5 people, including non-employing businesses;
- Small Businesses employs less than 20 full time equivalent people in the non-agricultural sector and less than 100 people in the manufacturing sector;
- Medium businesses are differentiated as those firms employing less than 200 people but more than 20 full time equivalent people.

The commission of European communities recommend SMEs to be defined:

> as enterprises having fewer than 250 employees, and either, an annual turnover not exceeding ECU 40million or an annual balance sheet total not exceeding ECU 27 million (Holmes, 2001).

Further the European commission defines 'small enterprise' as a firm that:

> has fewer than 50 employees and has either, an annual turnover not exceeding ECU 7 million, or an annual balance-sheet total not exceeding ECU 5 million (ECOJ, 1996:7).

The United States consider SMEs to include:

> firms with fewer than 500 employees where small firms are distinguished as employing fewer than 50 employees, and micro-enterprises have at most ten, or in some cases five, workers (OECD, 1999:7).

The definitions employed to define SMEs in Europe, United States (U.S.) and in Australia vary considerably. The lack of a international standard definition for SMEs presents problems for researchers wishing to conduct cross regional studies on SMEs. In reviewing the IS literature on SMEs researchers have to be wary of the regional context in which the research is conducted. In the context of the U.S., the small business category would include all Australian SMEs and some large Australian organisations. It is conceivable that small businesses in U.S. would be considered medium sized businesses in Australia.

There is growing body of literature focusing on small business and e-commerce (Poon and Swatman, 1996; Abell and Lim, 1997; Lymer and Johnson, 1997; Poon and Swatman, 1999). Despite variations in topic and approach, all of these authors have concluded that small businesses are increasingly using the Internet and that this will radically change the way some small businesses operate.

2.6 Small Business IT Research

A substantial volume of literature has been written concerning the adoption and use of IT by small business. To date the discourse on SMEs adoption and utilisation of technology has largely been exploratory. Small businesses are readily increasing the use of IT within their businesses (Cragg and King, 1993) but the nature of small business is also changing. The problems and issues faced by large business IT adoption are also faced by smaller businesses however the manner in which small business overcomes these issues are different (Delone, 1988). What was lacking within the IS discipline is a substantial body of theory that improves the understanding of relationships between the adoption, innovation, management and successful use of IT by small organisations (Moore & Benbasat 1991). Historically the small business literature suggests that IT has little real benefit for small business (Fuller, 1996). The small businesses tend to introduce computers to perform administrative tasks such as accounting and desktop functions as opposed to providing strategic management tool.

2.6.1 Small Business IT Issues

Fuller (1996) suggests that there are a range of issues that affect the ability of small businesses to adopt IT which include strategic direction, availability and suitability of resources, technical complexity, computer technology, education and external advice and resources. Other researchers (Lees & Lees, 1987; Cragg & King, 1993; Thong & Yap, 1995; Cragg, 1998) have identified other key issues influencing the adoption of IT and these can be broadly categorised into:

- The involvement of the owner/manager
- Strategic direction
- Available resources
- Technical complexity
- IT knowledge and education
- External issues

- *Owner / Manager Involvement*

The owner/manager of small business exercise an essential component to the uptake and utilisation of computing within the organisation. The degree of involvement by the owner/manager can directly influence the relative success of IT usage within the small business (Cragg & King, 1993; Thong & Yap, 1995; Thong *et al*, 1996; Lin, 1998; Palvia & Palvia, 1999). Raymond (1985) and Delone (1988) also signified the importance of owner/manager involvement but also noted that the inherent knowledge possessed by the owners is also significant. Small businesses that perceive themselves to be innovative do acknowledge their small business innovation is related to the use of IT.

The entrepreneurial owner/manger that drives innovation through the use of IT has a profound impact in an organisation. This is particularly so in small businesses, as the owner/manager is the main decisions maker and ones that determines the future of the business. The types of small businesses likely to adopt IT are those that possess owner/managers that are interested IT and have acquired a level of IT knowledge (Thong & Yap, 1995). That is they know what the technology can do and how best to use it within their organisation.

- *Strategic Direction*

In order to maximise the investment in IT, the implementation of IT should coincide with strategic plan for the business. The alignment of business and IT objectives is important but in reality small business are often removed from any strategic planning indulgences. The volatile trading environment and low resources restrict the ability of business owners to indulge in any serious business planning which may potentially maximise the investment in IT. But SMEs are renown for having a flexible and highly adaptive business structures enabling them to better cope with changing market conditions (Chang & Powell, 1998). The application of information technology in core business processes can positively influence the strategic value of IT. (Raymond 1985; Cragg & King, 1993)

- *Available Resources*

The small business IT infrastructure consists largely of stand alone or networked PC's with a range of desktop software installed on them. The costs of these resources is not a major IT adoption issue (Fuller, 1996) and requires minor IS expertise to use (Cragg & King, 1993). It is the support from management and other staffs to provide appropriate IT skills and knowledge that contributes to the successful adoption of IT. Raymond (1985) suggests that for a small business to gain the most success from IS implementation, the business needs to have the capacity to develop, administer and utilise applications beyond the basic up take of IS.

- *Technical Complexity*

The introduction of any new technology in the workplace can lead to resistance amongst staff, agitation and unrest with normal business operations. A lack of technical expertise and misinformation can aggravate the situation. In order to overcome the potential for technical complexity it is important to keep IT adoption simple and controllable (Cragg, 1998).

- *IT Knowledge/Education*

The process of education is an evolutionary one. The implementation of the IT infrastructure is a learning process for an organisation. Learning to use and maintain the applications is the next stage of IT adoption and finally gaining the experience to apply and possibly customise the applications to better suit the organisation is recognised as an important phase of the adoption process. (Lees & Lees, 1987)

- *External Issues*

The use of external consultants are closely associated with small business IT adoption (Cragg & King, 1993) especially for those businesses that lack IT

expertise or skills. Small businesses rely on external providers for advice and skills for development, implementation, training and ongoing support. Lees and Lees (1987) investigated the relationships between external vendors and consultants during the development and implementation. The issue of ongoing support and training are important for small business to successfully reap the full benefits of IT implementation. The use of friends and associates to help facilitate ongoing IT support is not uncommon amongst small businesses (Fuller, 1996) and these resources provide an essential service.

- *Competitive Advantage*

A factor encouraging the use of IT can be to acquire a 'relative advantage' (Cragg & King, 1993). Cragg & King describe relative advantage is associated with a desire to innovate which may be motivated by the perception that IT will save time, provide a better work environment and derive economic benefit.

Alternatively, competitive advantage can also be a major driver for the use of IT however from a small business perspective the desire to gain competitive advantage from IT is not as significant compared to large organisations. Small businesses consider IT as an enabling technology to create flexibility and increase profit. The use of IT by small businesses to gain competitive advantage has been problematic (Fuller, 1996). In many cases the problems and barriers to incorporate IT within the business over ride the potential to gain competitive advantage.

2.6.2 Inhibitors to Small Business IT Adoption

The lack of IT training, managerial time and economic factors were factors that discourage IT growth (Cragg and King, 1993). Localised resources within a small business are scarce. The owner/mangers of these businesses perform multiple roles. Time is a limited resource for these owner/mangers and any time allocated to new innovation and IT implementation is restricted.

A major factor that restricts IT growth in small businesses is the allocation of financial resources to upgrade or purchase new equipment and technology. It is a significant decision particularly for small businesses that are renown for poor cash flow (Welsh & White, 1975; Dandridge, 1979; Thong & Yap, 1995). If short-term gains can't be acquired relatively quickly, the decision to spend precious finances is approached with scepticism (Cragg & King, 1993).

This section has discussed the issues affecting the use of IT by smaller businesses. Previous research on small business and IT primarily focused on internal computing applications and did not encompass web based e-commerce activities (Poon & Swatman, 1999). The Internet now extends the use of computing applications from internal systems to inter-organisational systems fostering collaborative relationships and alliances. Within these collaborative relationships small firms that only collaborate with other small businesses will behave differently compared to large firms collaborating with large organisations only or a combination of small and large businesses (Cameron and Clarke, 1996). The need to investigate the use of web based e-commerce functions in SMEs is an important research area.

2.7 Initial Research into SME E-Commerce

Since the mid-1990s sustained growth in the Internet and in the conduct of e-commerce has fundamentally changed the global business environment. Numerous studies have highlighted how electronic business practices offer opportunities for organisations to leverage benefits, these include obtaining global reach, lower transaction costs, more efficient logistics, and increased business responsiveness. At all levels, e-commerce offers the potential to revolutionise internal and external operational and strategic business practices.

Despite these opportunities, there is considerable evidence highlighting the relative disparities that exist between large enterprises and SMEs in the adoption and utilisation of e-commerce (Lowry *et al.*, 1999; Poon & Swatman, 1997). The relatively low adoption of e-commerce by SMEs has attracted considerable academic attention. Previous studies have extensively examined the range of factors inhibiting e-commerce adoption amongst SMEs (Corbitt *et al.*, 1997; Lawrence, 1998; Freel, 2000). More recently, as increased numbers of SMEs have become Internet enabled, research has highlighted that the level and extent of e-commerce activity is far from homogenous amongst the SME business category.

As e-commerce gains commercial acceptance, SMEs have the opportunity to apply a vast collection of electronic tools to streamline their business processes and increase their revenue streams. The federal government in most developed countries acknowledge the benefits SMEs can acquire by adopting some of the e-commerce technologies.

Previous research on technology use by SMEs focused on the use of IT technology within the business. E-commerce deals with the use of technology internally within the organisation but extends the e-commerce technology externally with trading partners and customers. The Internet provides a low cost network infrastructure, which is globally accessible by individuals and most SMEs. The Internet provides a medium that can support dynamic and rich interactions between the user and the merchant. These online interactions are not common among other traditional print and broadcast media (Poon & Jevons, 1996).

The early use of e-commerce by SMEs stems from the encouragement of large organisations (Caldeira & Dhillon, 1997). Commercial pressure to adopt EDI from large organisations often formed the initial e-commerce experience for many SMEs. The pressure from trading partners has historically played a role in early IT adoption by SMEs (Iacovou *et al.*, 1995).

The benefits of EDI have been well documented. Tuunainen and Saarinen (1997) and Macgregor *et al.* (1998) discuss the advantages of EDI as promoting:

- efficient and effective intra and inter-organisational functions,
- the ability to respond quickly to global competition, risk, service and cost,
- facilitating better cash management,
- providing economies of scale when EDI is integrated in the value chain and
- gaining efficiency from functional integration.

However the uptake of EDI has been particularly slow in Australia especially by the SME sector (Chatfield & Alston, 1997). Researchers (Macgregor *et al,* 1998; Chen & Williams, 1998) outline reasons for failure of EDI in organisations:

- organisational culture,
- implementation difficulties,
- inadequate security measures,
- lack of resources and costs associated with development and implementation,
- needs to be a technology that provides more than the transmission of purchase orders,
- EDI transmissions needs to be legally authenticated.

The experiences of EDI implementation by SMEs have been diverse as a consequence new e-commerce technologies need to address the barriers and failures to gain wide spread appeal for subsequent e-commerce development (Chen & Williams, 1998).

The reasons for adopting the Internet and web based e-commerce functions differ from the adoption issues of EDI. Researchers (Iacovau *et al*, 1995; Mehrtens *et al.*, 2001) highlight at least two factors where the adoption of e-commerce technology differs from EDI adoption; these include organisational readiness and external pressure.

Other differences exists between the individuals involved with EDI and web based e-commerce. Web based e-commerce transactions can occur between individuals who are anonymous to each as opposed to EDI transactions that traditionally involves transactions conducted over value added networks (VANs) where the identities of individuals are known. Small businesses are generally alienated from using VANs because of their exclusivity. The push from large business to use proprietary EDI systems is not as apparent on the Internet.

The global reach of the Internet still attracts organisations that wish to formulate a global marketing strategy. However despite the ability to reach potential customers worldwide the relative success of the Internet as a marketing tool is questionable. This may in part be related to customers not being connected to the Internet, lack e-commerce expertise, suffer technical limitations and the cost of connectivity and support (Abell & Lim , 1996).

2.7.1 Factors driving E-commerce

A great majority of SMEs are still entrenched with the analogue era using the traditional phone and fax communication technologies. The introduction of the Internet has advanced the change from analogue to digital technologies. Older technologies such as phone and fax now have digital alternatives. The advent of the Internet has revolutionised business communication. E-mail is a standard communication platform for large organisations and the diffusion of e-mail is now spreading to smaller businesses.

Within Australia the interest in SME e-commerce research has steadily increased. A review of the initial literature suggests that much of the earlier research focus centred on the exploring factors that contribute to the adoption and of e-commerce

among SMEs (Abell & Lim. 1997; Lymer & Johnson, 1997; Poon & Swatman 1996; 1999). Other researchers (O'Reilly, 1996; Lawrence & Keen, 1997; Corbitt *et al.*, 1997; Tan, 1998; Tan & Konstapel, 1998; Purao & Campbell, 1998; Carroll, 1999) identified and explored barriers to e-commerce adoption among SMEs. These researchers signified the importance of the web and determined that the Internet will have a profound impact on the methods in which SMEs will conduct business in the future.

In 1996, Poon and Swatman, conducted a survey of over 300 businesses investigating small business use of the Internet. Their findings indicated that information based industries were far more active with their use of e-commerce then any other industry. Key factors for driving Internet usage included customer assess, business networking and increase levels of marketing.

Subsequent research by Poon & Swatman (1997) the five most important factors driving the adoption of the Internet were:

- wider corporate exposure,
- direct and indirect marketing,
- a low cost communication medium,
- access to potential customers and,
- company image enhancement.

They acknowledge that most of these factors relate to market reach and accessibility however the use of the Internet as a 'product delivery channel' and for 'online sales and transactions' did not rate in the top five business drivers in their study. A possible explanation offered by the researchers was the lack of Internet banking services provided by major banks and the slow uptake by the general public in using emerging Internet banking services. Although these factors proved inhibitive in 1997, the diffusion of Internet banking services has been dramatic and is currently regarded by major banks as an essential part of their customer relationship model.

2.7.2 Perceived Benefits of E-commerce

Research by Poon and Swatman (1999) acknowledge that it is the perceived benefits derived from Internet commerce that provides the major motivation for small businesses to incorporate some form of e-commerce. The classification of the perceived benefits can be distinguished by direct (quantifiable benefits) and indirect benefits (social or organisational) benefits that are not measurable. They found that the long-term perceived indirect benefits provide the most significant motivator to incorporate Internet commerce within small businesses.

The initial research by Poon and Strom (1997) of twenty-three small businesses actively using the Internet suggested that the five most important drivers for using the Internet were:

- direct and indirect advertising,
- low cost communications,
- easy access to potential customers,
- company image enhancement and ,
- form and extend business networks.

Subsequent research by Burgess and Cooper (1999) confers with these findings that e-commerce can provide lower operating cost but also, faster and better informed business decisions. E-commerce enables closer trading relationship with customers that can overcome geographic distances (Smith, 1998) ensuring increase customer loyalty and subsequent word-of-mouth on selling (Scollary *et al.*, 1999). Consumers believed that they had greater buying power by been more informed about products and services, Zimmerman (1998).

Other benefits identified by researchers included the ability for SMEs to be more competitive with large business (DFAT, 1997), have access to cost effective global communication (Adam *et al.*, 1999), and an ability to acquire increase competitive advantage (Whiteley, 1998).

2.7.3 Competitive Advantage derived from E-commerce

The use of IT by SMEs has traditionally been use as a business support tool, a way to increase operational efficiency (Hagman & McCahon, 1993). In the past IT has not been considered a mechanism to provide competitive advantage or other ancillary benefits. However emerging research by Poon and Swatman (1997a) suggest SMEs consider web based e-commerce can provide a competitive advantage. Although no financial advantage was recorded or measured, SMEs believed in the long-term that a competitive advantage could be gain.

Subsequent analysis of surveys conducted by Poon and Swatman (1998:305) found that 95% of 117 respondents considered the Internet as a 'competitive necessity' rather than providing a competitive advantage. The other respondents that did not believe the Internet could provide a competitive advantage cited reasons as

- the presence of other competitors already on the Internet,
- not exploiting the Internet fully,
- a view that competitive advantage was non-existent or dwindling
- that competition was irrelevant. (Non-profit organisation, market leader position)

With respect to the use of new electronic communication technologies, Kaplan *et al.*, (1997) examined the use of a range of different communication mechanisms each contributing significantly to the operation of the business however small businesses did not perceive the communication tools as providing strategic advantages. The study also found that respondents failed to signify the importance of the Internet as a strategic business tool to acquire competitive advantage.

2.7.4 Entrepreneurial Opportunities

- *Collaborative networks*

The Internet provides a network structure that is highly suited for collaborative small business networks. The use of e-commerce technologies and the Internet promotes flexible, cost effective business network that provides SMEs an ability to quickly formulate business relationships spanning the globe for relatively low cost. The benefits for collaboration for SMEs are apparent however the risks associated with open network characteristics for the Internet can potentially disadvantage numerous SMEs.

- *Dis-intermediation*

Web based e-commerce provides a unique opportunity for SMEs to alter the communications pathway found in conventional value chains. E-commerce can provides organisations with the chance to alter traditional business relationships, shortening the value chain and conventional trading linkages. Poon and Jevons (1996) suggest that within the value chain, at least four different entities can related to a central organisation. These include: suppliers, customers, business partners and competitors. Each of these entities has the chance to directly communicate with each other by-passing the central organisation. The conventional value chain consisting of the manufacturer, wholesaler, retailer and consumer is susceptible to elements of disintermediation facilitated by the Internet.

- *Marketing*

Golden and Dollinger (1993) identified the four types of inter-organisational relationships where various marketing activities could be applied. These inter-organisational relationships were defined as *confederation*, *conjugate collectives*, *agglomerate collectives* and *organic collectives*.

Confederation is described as "Firms which compete with one another but maintain some contractual functional activities in common, coordinated by a central management" (Poon & Swatman 1996a:364). *Conjugate collectives* are inter-relationships represent value added links along the value chain, *agglomerate collectives* represent organisational relationships associated to industry standards and recommendations and *organic collectives* signify traditional non-contractual relationships such as voluntary relationships, and other memberships to community services groups (eg. Rotary, Lions Club).

A mapping of inter-organisational relationships with general internal marketing strategies by Poon and Swatman (1996a) suggest different Internet marketing strategies can supports a range inter-organisational relationships. SMEs have an opportunity to effectively conduct a range of Internet marketing activities, which target these inter-organisational relationships that exist in each Internet mediated network.

2.7.5 Barriers to e-commerce adoption

Small organisations have limited resources and have limited computer sophistication (Swatman & Swatman, 1991). Previous empirical findings acknowledge that economic costs and lack of technical knowledge are two of the most important factors that hinder IT growth in small organisations (Cragg & King, 1993). Successful technology implementation requires a basic mix of organisational resources such as available time, adequate funding, and some technical skills (Kwon & Zmud 1987). A level of "organisational readiness" (Iacovau *et al.*, 1995) is required to overcome many of the inherent barriers to e-commerce adoption.

The uptake of e-commerce by Australian SMEs is reputedly slow (DoCITA, 1998). Few SMEs used Internet to conduct transactions with customers and suppliers (Purao & Campbell, 1998). In an environment where the perceived benefits from e-commerce were apparent some SMEs adopted e-commerce

quickly while others were more cautious (Dos Santos and Peffers, 1998). Those SMEs that adopted e-commerce early were not always guaranteed immediate benefits due to the resistance from consumers using the new technology.

The slow uptake of e-commerce attracted much attention from researchers who investigate a range of inhibitors to e-commerce adoption (Cragg and King, 1993; Iacovou, Benbasat & Dexter, 1995; Cameron and Clarke, 1996; Poon & Swatman, 1996; Lawrence, 1997; Corbitt *et al.*, 1998). The e-commerce inhibitors that have emerged in the literature share similarities with factors that have inhibited other technology adoptions. These include the costs of technology, a lack of managerial direction and a lack of technology skills and financial resources (Swatman and Swatman, 1991; Cragg and King, 1993; Iacovou *et al.*, 1995).

- *Role of management*

The role of management continues to play an important role in the adoption of any technology. The influence of management on e-commerce adoption can be more significant than other potential barriers to e-commerce (Corbitt *et al.*, 1997). Management contributes enormously to the relative success of any implementation of technology (Poon & Swatman, 1997b; Akkeren & Cavaye, 1999a; Chappell & Feindt, 1999). In order to achieve implementation success it is crucial for management to endorse, support and encourages the uptake of technologies like e-commerce. A review of the literature suggests emergent inhibitors to the adoption of e-commerce can be classified as those barriers associated to the SME directly and factors that influence the trading environment in which these SMEs operate. The various barriers are summarised in a table below:

Table 2-1. Barriers to E-Commerce Adoption

Organisational Barriers	**Barriers apparent in the Trading environment**
• Lack of financial resources • Lack of management enthusiasm, knowledge and understanding • Security and privacy • Lack of technology skills and experience • Lack of other organisational resources	• Critical mass of suppliers and consumers willing to use e-commerce • Level of services provided by consultants and Internet service providers • Level of support provided by industry and government

- *Lack of financial resources*

The ability for SMEs to fund innovative e-commerce initiatives presents a major inhibitor particularly if the organisation lack resources such as IT expertise to develop and maintain e-commerce applications (Clarke, 1996; Purao & Cambell, 1998).

The cost associated with implementing new technology is a prohibitive deterrent for many SMEs. Unless the perceived benefits from adopting new technology are realistically achievable, cautious SMEs are unlikely the experiment (Corbitt *et al.*, 1998). However there is evidence to suggest that some SMEs consider the costs

associated with e-commerce do not present a barrier and can in fact reduce the business costs (Behrendorf *et al.*, 1996).

- *Lack of managerial enthusiasm*

The role of management and amount of technological expertise available in SMEs can significantly influence the ability for businesses to incorporate e-commerce. Research conducted at Monash University suggests that management is exposed to many issues that can inhibit the uptake of e-commerce (Corbitt *et al.*, 1998), these include:

- increase business complexity attribute by e-commerce,
- general lack of resources and complications associated with implementing change,
- low perception of value added of e-commerce technologies,
- lack of independent advice on implementation issues,
- concern over making the right decision,
- and e-commerce not a priority.

It is suggested that the lack of motivation to initiate e-commerce activities is related to an unfamiliarity of Internet and a lack of knowledge and understanding of e-commerce (Purao & Cambell, 1998). A fear of technology "technology phobia " also presents a significant barrier (Behrendorf *et al.*, 1996).

While many SMEs possessed the capability to conduct e-commerce, many are reluctant to (Lawrence & Chau, 1998). Lawson *et al.*, (1999) also found that the level of IT capability to conduct e-commerce was adequate in small manufacturing firms but only a small number were engaged in Internet based transactions. Their study found that barriers to utilising e-commerce could be divided into technical barriers and social barriers. The technical barriers related to SMEs not possessing appropriate technological infrastructure, skills and security. While social barriers related to SMEs having:

- an inability to identify potential e-commerce benefits,
- a lack of determination to change from manual processes to electronic,
- and a lack of adequate security and privacy measures in place.

- *Security and Privacy*

The issue of privacy and security was highlighted in studies as a concern for both vendors and consumers conducting electronic transaction on the Internet (Purao & Cambell, 1998; KPMG, 1998; McComb, 1999). The perceived lack of privacy and security signal concerns from vendors and consumers using e-commerce transaction systems based on the Internet (Corbitt *et al.*, 1998). However emerging research (Strom *et al.*, 1998; Telstra, 1997), suggest the issue of security by consumers using the Internet as a transaction is not a major issue.

Lack of technological skills and resources

The lack of technical experience and knowledge are key factors that inhibit the introduction of technology. This was identified in past literature exploring the adoption of IT in small business and again in studies examining the adoption of e-commerce among SMEs.

- A lack of cost effective e-commerce enabled software.
- Computer Phobia.
- the wide number of technology and software.
- incompatible systems and software.
- lack of available standards for systems integration.
- differential requirements of senders and receivers.
- system upgrading and replacement costs.
- and lack of training and technical skills.

The above factors identified in the Monash University study (Corbitt *et al.*, 1998) were considered to contribute to the lack of technical ability to conduct e-commerce. However overcoming these apparent technological barriers may not be a major concern. In a survey conducted by a KPMG consulting group in the United Kingdom found that technological concerns were no longer considered a high level barrier to implementing e-commerce (Baker, 1997). The KPMG study considered the issues of costs and security, rated more important than technological factors.

- *Environmental Concerns*

The barriers discussed so far relate to the individual organisations. Towards the end of the 1990's researchers discovered other inhibitors that are often beyond the control of the organisation also contribute to the lack of implementation among SMEs. These barriers arise from pressure of the external trading environment in which SMEs operate (Thong & Yap, 1995; Iacovau *et al.*, 1995). The most notable barriers are is the issue of security, critical mass of users of e-commerce along the value chain, services provided by external consultants and the level of support from industry and government.

- *Consultants, ISPs*

The external influence of e-commerce consultants and other service providers can be an important part for the success of any e-commerce initiatives (Ramelet & Bauer, 1999). The level of professionalism and ethics among consultants in a new technology field is difficult to gauge. The level of experience, skills displayed by e-commerce consultants can be varied where accreditation of skill and competencies are not required (Purao & Cambell, 1998; Bode and Burns, 1999). Hesitation by SMEs to change existing manual systems and lack of off the shelf easy to install software also contribute to a cautious adoption of e-commerce technologies (Scollary *et al.*, 1999). However it becomes problematic for consultants when e-commerce aims and objectives are not clearly defined (Cragg, 1998).

- *Critical Mass*

Davies and Garcia-Sierra (1999) suggests that for e-commerce to become widespread there needs to be a critical mass of potentially connected customers. A consideration for a critical mass of individuals along the value chain is an important factors for any new technology to be established within an industry whether it be e-commerce or IT. The usefulness of the technology is dependent on the number of individuals using the technology and associated software (Caskey and Sellon, 1996).

The successful use of e-commerce along the value chain requires the acceptance of standardised applications and technology implemented on a suitable infrastructure that is accessible, reliable and cost effective otherwise the uptake of e-commerce and subsequent technologies maybe hindered. These issues have been covered by other researchers in the past (Pennings & Harianto, 1992; Caskey and Sellon, 1996). In addition to a critical mass of customers, suppliers and administrative agencies, it is imperative that a sound legal framework and security standards are formulated (Booze *et al.*, 1997). It is the role of government and industry to pursue a suitable national infrastructure to promote the use of e-commerce.

- *Industry & Government Support*

A level of support from Industry and Government to encourage SME to adopt new technologies is paramount (Thong and Yap, 1995; Akkeren & Cavaye, 1999). The need for e-commerce education and training to ensure that SMEs understand the value of e-commerce is vital to leverage the benefits of integrating their businesses into the supply chain (Davies & Garcia-Sierra, 1999). The role of the government to create a national infrastructure that supports e-commerce co-operation among community bodies is important (Corbitt *et al*, 1998).

The competitive pressure within an industry can influence SMEs to incorporate e-commerce. The use of e-commerce by competitors may entice SMEs previously reluctant to engage in e-commerce activities to adopt e-commerce in order to maintain a competitive position. The SMEs that lag behind the early adopters will find it increasingly difficult to acquire the knowledge and expertise required to prosper in the online marketplace.

This section has outlined numerous studies exploring the inherent barriers associated with adopting or contemplating e-commerce by SMEs. In-order to overcome barriers to e-commerce, SME need to ensure that e-commerce is given a commercial priority, identifying a real business needs. An appropriate level of reliable and cost effective technical infrastructure is available along with suitable resources to develop, support and maintain e-commerce initiatives. The implementation of e-commerce software needs to be simple to install, operate and support.

2.7.6 Inter-organisational systems

The spread of e-commerce is growing at a significant rate. The application of e-commerce functions in organisations large and small can significantly influence processes internally within the organisation and the interactions with external business partners and customers. The spread of e-commerce throughout an organisation can be described in three categories: Intra-organisational, inter-organisational and business to consumer e-commerce activities (Kalakota & Whinston, 1996).

Intra-organisational e-commerce depicts those e-commerce applications that coordinate and enhance information sharing within the boundaries of the organisation. Intranets, human resource information systems, and databases all are examples of intra-organisational e-commerce systems.

Inter-organisational e-commerce systems support the transaction and communication systems between the organisation and other trading entities providing value added product and services to aid in the final transaction with the end consumer. Examples of these e-commerce systems include extranets, inventory, finance, and EDI based procurement systems.

Business to consumer e-commerce applications support and maintain business transactions with the end consumer. The end consumers may be individuals, other organisation and the government seeking a finished product or service. Examples of these types of e-commerce systems would include customer information systems, online sale of products and services, web sites allowing users to access demonstrations, product information and the provision for direct contact and feedback to the organisation.

- *Supply chain*

The use of e-commerce technologies however is becoming more pervasive in other aspects within the organisations and externally along the organisational supply chain (Benjamin and Wigand, 1995; Brandtweiner, 1998). E-commerce has enabled SMEs to integrate more effectively into their local and regional supply chains extending the research capabilities of SMEs for finding efficient sourcing/purchasing methods, reduced administration time/expense, more effective data exchanges, increased visibility and sales, and improved customer services (Davies & Garcia-Sierra, 1999). The use of e-mail provides a superior communication tool that can supersede the traditional fax and telephone.

The potential e-commerce benefits available to SMEs that interact electronically with trading partners may include faster communications, more effective dissemination and collection of information and closer relationships along the supply chain (Davies & Garcia-Sierra, 1999).

The capacity to acquire e-commerce benefits along the supply chain is however dependent on the ability for SMEs to overcome potential problems along the pre-contract, contract and post contract phases. Davies and Garcia-Sierra (1999) identified a range of e-commerce problems associated with the transaction process. They found post-contractual problems related to lack of support information, not utilising relationships and poor customer service. Contractual problems included sourcing supplies, daily financial management, poor communications and slow design development however they found that SMEs encountered the most problems at the pre-contractual phase where market research, increase enquires and non-focused marketing are problematic areas.

The most important hurdle for SMEs to overcome relates to technical incompatibilities and the lack of understanding of the potential benefits of e-commerce (Davies & Garcia-Sierra, 1999). Studies by Poon and Swatman (1997a) found the use of Internet communications along the value chain was more prevalent with customer relationships as opposed to business relationships between the supplier and the organisation. It was acknowledged that Internet communications did not replace traditional phone and fax communications but provided an alternative communication medium.

To effectively acquire benefits from e-commerce, SMEs may need to substantially change or re-engineer many of their business processes (Zimmerman, 1998; Giaglis, 1998). Such re-engineering requires the development and implementation of new concepts and business models in order to gain a greater advantage through the use of Internet and e-commerce.

- *Virtual Collaboration – Collaborative alliances between SMEs:*

Since the work of Burns and Stalker (1961), organisational theorists have argued about the relative merits of more organic organisational structures for adapting to the increasingly dynamic and uncertain business environment induced by globalisation and international competition (Drucker, 1988; 1993). As intra-organisational and inter-organsational information systems have become pervasive in the conduct of commerce, organisations have deployed a variety of organisational structures and business forms in their efforts to achieve flexibility, agility, and competitive edge (Johnston & Vitale, 1988). From business process re-engineering and downsizing through to the formation of business networks and strategic alliances corporations have been at the forefront of efforts to maximise the benefits from information and communication technologies (ICTs) (Hammer & Champy, 1993).

With the dramatic and sustained growth of the Internet, businesses have increasingly been able to exploit its global connectivity to conduct e-commerce (Luftman, 1996). E-commerce involves enterprises establishing electronic relationships with their suppliers, resellers, distributors, business partners and customers. It offers businesses the opportunity to re-engineer their supply chains to leverage benefits including reduced transaction costs, reduced inventory, more efficient logistics, improved business responsiveness and competitive edge (Turban *et al.*, 2000). In essence, the web has revolutionised internal and external operational and strategic business practices (Kalakota & Whinston 1996).

In analysing these web developments one focus in the information systems literature has been on the emergence of a new business form as an exemplar of web-based commerce - the virtual organisation (Davidow & Malone 1992). While definition of the concept remains problematic, a considerable volume of research continues to be produced promoting the benefits of going 'virtual' (Boudreau *et al.*, 1998). Significantly, most of this literature has been derived from the study of large businesses engaged in business-to-business (B2B) e-commerce and has emphasised the centrality of web-enabled collaboration (Cooper & Rousseau, 1999).

Currently there is a lack of literature specifically addressing the issue of virtual-ness in small business. While there exists a multitude of purported benefits available to small businesses that embrace elements of going virtual there remains a significant lack of real-world models of virtual organising in the small business sector (Barnatt, 1997).

The use of web-based e-commerce has initiated various entrepreneurial activities including the formation of various cooperative alliances, strategic alliances and networks (Poon & Swatman, 1996a). The ability to share and exchange

information across these networks promotes operational efficiencies and effectiveness from opportunities previously unavailable to them when operating in an independent manner. SMEs involved in formal and informal strategic relationships increase their potential to gain a competitive advantage (Cameron & Clarke, 1996; Poon & Swatman, 1996) however there exist dangers for small businesses to be dependent on such alliances (Miles *et al.*, 1999).

The types of information exchanged among members of these SME networks can involve sharing industry information, marketing costs, product development and collective buying power of raw materials and products. The Internet and emergent new e-commerce technologies provide an infrastructure supporting the formation of mutual networking and alliances. The provision for business-to-business (B2B) e-commerce activities at a local, national and international level is realistically feasible and accessible to SMEs.

Previous Australian research that has explored the topic of virtual organisations in the small business context, has defined virtual small business as 'a set of flexible and short-term multi-partner relationships among independent economic agents spanning multiple time zones and wide geographical locations; and mediated by networked information and communication technologies' (Tetteh, 1999:6). Similarly, in a European context virtual small businesses organisations have been defined as 'dynamic multi-enterprise collaborative structures specifically designed to increase creativeness and competitiveness in delivering innovative global products by bringing their core competencies within a value adding chain in a network of enterprises' (CEC, 1999).

In the last ten years the web has fundamentally changed the global business environment. On the web the fastest growing sector remains B2B e-commerce which already constitutes more than 70% of the total value of all e-commerce activity (Marshall & Morales 1999). Forecasts of the value of global B2B by 2004 vary (between $1-7 trillion dollars), but there remains consistent agreement that the trend is upward (Industry Standard, 2000). Such optimistic forecasts illustrate that e-commerce has already delivered tangible benefits to many businesses across a range of industry sectors. These benefits are considerable and are exemplified through the concept of virtual organisation. Global reach, spatial and temporal independence, velocity to market, agility, flexibility, improved customer responsiveness, reduced overheads and transaction costs are some of the many benefits that have been attributed to virtual organisations (Boudreau *et al.*, 1998).

Considerable academic attention has been focused on the benefits of virtual organisations and has lead to the identification of numerous forms of virtual functions virtual teams, virtual projects, virtual offices, virtual factories, virtual workplaces, virtual corporations and virtual communities all providing different perspectives on the concept (Cascio, 1999).

In recognition of these different forms of virtual organisations a number of researchers have developed typologies, taxonomies and theories of virtual organisations (Palmer & Speier, 1997). These approaches have assisted in highlighting the breadth of usage of the virtual organisation concept and have also revealed the extent to which previous definitions of virtual enterprises have

predominantly been generated from studies of big business and/or B2B e-commerce. However, to date there has been limited research into the applicability of the concept of virtual organisations and/or virtual-ness to small businesses engaging in e-commerce (Barnatt, 1997).

2.8 The Utilisation of E-commerce by SMEs

The previous section has highlighted the factors that contribute to the adoption of the Internet and e-commerce technologies. Research has started to emerge outlining the potential benefits of e-commerce and the Internet for SMEs but there still is a lack of literature investigating the actual use of e-commerce by the SMEs. Early e-commerce research conducted by IS researchers was closely aligned to studies exploring the use of the Internet by SMEs. Abell and Lim (1996) surveyed 116 SMEs in New Zealand exploring the use of the Internet, Internet benefits, issues and marketing. The benefits reported by Abell and Lim include:

- improved information gathering,
- availability of expertise regardless of location,
- better service and support from suppliers,
- increased productivity,
- better awareness of business environment,
- ability to reach international markets,
- and faster more flexible delivery from suppliers.

These researchers found that the major use of the Internet was for communications internally and externally to the organisation. This included acquiring information from suppliers and providing information to customers. A major concern at the time related to the security of the Internet and internal networks and legal concerns.

Auger and Gallaugher (1997) study of small and medium sized firms found that the most important factors driving the use of the Internet was for obtaining and disseminate information. A comparison between small and medium firms suggested that four expected benefits were derived from Internet use. These consisted in order of importance as;

- improving the company image,
- providing customer support,
- increasing sales and creating a site in response to customer's requests.

However, medium size firms did not consider increasing sales as important as the other three listed benefits. The most notable barriers to gaining benefit from the Internet related to difficulty promoting the site. Security concerns were not signified as a significant problem in their study.

Medium sized firms also acknowledge the extra resources (time and personnel) required to support the online customer feedback, diminished the expected benefits from having an Internet presence.

A study by Haynes *et al.,* (1998) comparing large organisations, medium and small firms tend to support the findings listed by Auger and Gallaugher (1997). Although the organisational characteristics differed substantially between the

large, medium and small businesses the Internet usage patterns were similar. There were variations however in their creation of their home pages. Small businesses tend to possess a web site (52.4%) more so than large corporate organisations (49.4%) however medium sized businesses were least likely to have a web site (34.6%).

The reluctance of medium sized businesses to own a web site (Haynes *et al.*, 1998) and use e-commerce for customer support (Auger & Gallaugher, 1997) does not necessarily reflect an unwillingness to use e-commerce. Ridley and Ridley (1999) found that medium sized businesses were more likely to use of e-commerce for electronic procurement processes compared to other SMEs. Their study suggest that management of medium sized businesses are more informed of the potential benefits derived from e-commerce and that the medium sized businesses included in their study were already integrating IT in a sophisticated manner.

Booze *et al.*, (1997) research of European's SMEs use of e-commerce, suggested that four types of e-commerce activities were apparent:

- Substitution of traditional communication (phone, fax and face-to-face) with e-mail and multimedia.
- Information Access: The ability to access management information and business documentation.
- Business Process Management: The ability to conduct existing business processes in an alternative manner within the corporate boundaries.
- Inter-enterprise/consumer Business Process Management: The ability to conduct existing business processes in an alternative manner beyond the corporate boundaries.

The researchers found that the first two types of e-commerce usage, *substitution of traditional communication* and *information access* only provide limited benefits from e-commerce. Substantial benefits from e-commerce were gained when the existing business processes were adapted to the new environment where transactions were conducted electronically.

The process of re-engineering business processes in SMEs has been explored by Chang and Powell (1998). In their study four factors; *structure, culture, resources* and *technology* emerged as influencing the ability to conduct organisational change. The SMEs that can implement the more advanced forms of e-commerce integration are the ones most likely to adopt these new value added structures (Booze *et al.*, 1997).

Poon and Swatman (1999) acknowledged that e-mail was considered the most useful function of the Internet although not widely used with suppliers. This supports Booze *et al.* (1997) notion SMEs are using alternative communication mediums. Although it has been cited in the literature that SMEs can benefit from the integration of e-commerce into internal business processes, the researchers discovered no web based systems integration with internal applications among their cases. However all participants did exhibit entrepreneurial characteristics. The researchers also found that participants were hesitant about incorporating financial transactions systems. Factors that did influence to the use of Internet

commerce were the nature of the product and the industry sector but a key factor affecting the use of Internet commerce by the SMEs was the enthusiasm of management.

Although there is a growing body of literature dedicated to the analysis of the technical and operational aspects of e-commerce, there is little empirical research on topics relating to the factors that would lead to the successful adoption and implementation of this emerging technological innovation and business practice. Moreover, there is little empirical research to date that examines the utilisation of e-commerce by SMEs in organisations once the e-commerce has been adopted.

2.9 Emergent SME E-Commerce Models Prior to Data Collection

This section discusses a range of e-commerce models and frameworks that existed in the IS literature prior to data collection. These models and frameworks represent different areas of e-commerce research and provide some insight into the e-commerce activities of organisations conducting and incorporating e-commerce.

As the interest in e-commerce research from the IS community and practitioners grows there exists a demand for the development of new e-commerce business exemplars to help model the impact of e-commerce on organisational systems and processes. It can be problematic when researchers attempt to adapt established IS models and frameworks that are based on technology research distinct from e-commerce. These problems can escalate when researchers try to use IS models/frameworks intended for large organisations to model the behaviour and dynamics of SMEs (Levy *et al*, 1999).

The dynamic elements of an electronic trading environment facilitated by the Internet and other electronic networks give rise to models reflecting alternative approaches to business. The flexibility of the trading environments requires the new business models to be sensitive to demographic groups important to the business, new channel opportunities for sales and marketing presents an alternative mode of communication sparking dramatic change. Encompassing the new e-commerce paradigm (Currie, 1998) are the legal ramifications to support and govern these new modes of commerce.

Early e-commerce models were high-level generic e-commerce frameworks with minor application for SMEs as a business group. These frameworks include Clarke's (1983) *Five Phase Process Model*, Kalakota and Whinston's (1998) *Pillars of E-Commerce Framework* and Zwass's (1998) *Hierarchical E-commerce Framework.* Although other e-commerce models such as Bento's (1996) framework for the analysis of the WWW and KPMG's *E-commerce Maturity Model* proved beneficial in the design of early e-commerce models for SMEs.

The *E-commerce Component Model* proposed by Chan and Swatman (1999) establishes a three tiered meta-level model consisting of a services, infrastructure and legal approach which encircle various organisational definitions of e-commerce. Each component exhibits different weighting depending on emphasis placed by representatives of each component in the model. The model encompasses a set of objects that may or may not be applicable depending on the

type of Internet-based e-commerce researched. Each of the objects enclosed by the meta-levels is assigned various weighting determined by the parties representing each faction of the model. The model is extensive and attempts to cater for a range of different types of e-commerce activities. However the calculation of the weightings and the relative importance of the components within the realms of the model is hard to quantify and qualify due to the subjective nature of the parties involved with each component.

In developing the e-commerce component model, Chan and Swatman (1999) review several e-commerce models, which include: Clarke's (1983) five-phase process model; Kalakota & Whinston's (1996) pillars framework and Zwass's (1998) hierarchical framework of e-commerce.

The five phase process model outlined by Clarke (1983) depicts a model with an emphasis on the procurement function of e-commerce. The model provides a detailed analysis of the issues and business flows for each stakeholder in the procurement cycle but has limited applicability to the current use of e-commerce encompassing the role of the Internet and other e-commerce activity.

The generic e-commerce framework proposed by Kalakota & Whinston (1996) presents a framework illustrating that public policy and technical standards are the essential support structures supporting e-commerce infrastructure such as networks, multimedia content, messaging and common business service. The model is easy to comprehend but offers little detail for researchers to use explore e-commerce at a greater depth particularly among SMEs.

Zwass (1998) developed a hierarchal framework depicting a layered approach to categorising different levels of e-commerce functionality. Essentially the model compartmentalised a range of e-commerce functions. The model provides limited flexibility due to the discrete allotments of e-commerce functions.

A framework proposed by Bento & Bento (1996) to analyse the adoption of the World Wide Web for business depicted four dimensions; *marketing*, *information dissemination*, *control* and *information acquisition*. The dimensions identified in the framework provide a useful method to explore the business use of the WWW. E-commerce has expanded considerably and the dimensions provided in this framework are limited to account for the various evolving e-commerce activities found in the new millennium.

The *KPMG E-Commerce Maturity Model* (1997) outlines three stages or e-commerce maturity. Stage 1: *Experimentation*, Stage2: *Ad Hoc Implementation* and Stage 3: *Integration*. The model assumes that the organisations reach various levels of maturity before commencing to another stage. McKay et. al. (2000) suggest that the model is limited in a couple of ways. The model treats e-commerce activities and IT investment independently of existing IS/IT used in traditional business practices and that the model does not account for the substantial organisational and technical challenges required to progress between stages.

A theoretical model designed to assess the impact of the Internet on small businesses was developed Lymer *et al.*, (1998). The model developed a two dimensional matrix of Internet impacts on small business. The model mapped four levels of small business impacts (business contacts, industry, organisation, tasks) against five associated categories of impacts (productivity, information retrieval, communications, knowledge and environment). It is thought that the model may be helpful to develop a framework for comparison of small business experiencing significant impacts from the Internet.

Within Australia researchers were actively proposing a new range of e-commerce models specifically addressing the actions of SMEs. Unfortunately the uptake of e-commerce by Australian SMEs was particularly slow and this has placed limitations on the early development of SME e-commerce models. In a study of twenty-three small businesses, Poon and Swatman (1997a) found no apparent integration of Internet commerce applications with internal systems. Early e-commerce SME models proposed by researchers reflect a limited range of e-commerce activities conducted by SMEs prior to the new millennium.

The emergence of the Internet and arrival of e-mail in the public domain has changed the way we communicate globally forever. The ability for SMEs to communicate with other organisations and customers for little cost on a global basis has revolutionised small business communications. Poon and Strom (1997) recognised the emergent use of e-mail among small businesses for collaborative and other business initiatives. They developed a four-stage model of business development identifying four possible types of business relationships attributed to e-commerce communication technologies. The four stages were described as:

- the search for business opportunities,
- explore collaboration possibilities,
- consolidate project details and
- structured information exchange.

This model reflects the preliminary use of e-commerce technologies by SMEs at the time. As SMEs gain experience and knowledge about e-commerce the potential increase in organisational benefits and relative advantage can become apparent. Innovative and entrepreneurial management are prepared to experiment with e-commerce in search for an increase in relative advantage (Poon & Jevons, 1996). The key drivers for Internet adoption are the perceived benefits from using the Internet, active involvement and enthusiasm by management and the potential business opportunities of trading online (Poon and Swatman, 1997b).

The development of Burgess and Cooper's (1999) *Model of Internet Commerce Adoption Model* (MICA) was a useful model to explore the use of web sites among SMEs. Categorising the use of web sites into three distinct stages; *promotion*, *provision* (of information) and the *processing* (of transactions). This model provides a useful tool to categorise the functionality of the web based e-commerce sites but does not address the use of e-commerce on internal processes or how SMEs may develop an e-commerce strategy.

Grant's (1999) *Model of E-Commerce Maturity for Small Businesses* explores the internal processes to adopt successful e-commerce strategies. He prescribes five stages of e-commerce maturity. These stages are called:

Stage 1: Immaturity – lack of awareness of e-commerce,
Intervention: Basic awareness raising,
Stage 2: On the Internet,
Intervention: Specific business awareness raising
Stage 3: E-commerce provisional strategy decided,
Intervention: Overcoming the obstacles,
Stage 4: Ready to Implement,
Intervention: Implementation,
Stage 5: Integrated and effective e-commerce.

The five stages plus four interventions depicted in Grant's (1999) model outline a series of steps and interventions that small business undergo in order to reach e-commerce maturity. The model assumes that in order to reach e-commerce maturity small businesses needs to integrate e-commerce into business processes and information flows which may not always be the desired by small businesses (Ihlstrom & Nilsson, 1999). It also assumes that an explicit e-commerce strategy needs to be in place at stage three before proceeding to the next level. Small businesses are unlikely to have planned a business strategy let alone an e-commerce strategy.

Past research suggests that IT can leverage strategic advantage in organisations that can successfully integrate IT into internal and external business processes and information flows (Venkatraman, 1991, 1994). Early Internet adoption research by Poon and Swatman (1997a) found that their was no evidence among their study of twenty-three small business, for integration of Internet commerce applications with internal systems. Three reasons were proposed by the Poon and Swatman that may account for a lack of integration, these include:

- a lack of volume of transactions to warrant direct integration,
- a lack of in-house skills to develop such integrated applications,
- no external assistance or pressure to implement integrated solutions.

Based on the Venkatraman's (1991) model of IT-enabled business transformation, Poon and Swatman (1997a) developed a three stage model of Internet to internal system integration that relates potential benefits to the level of organisational process adjustment. However Venkatraman's (1991) model of IT-enabled organisation transformation is based on large organisational research and explores organisation transformation internally and externally at a sector wide level. The proposed model by Poon and Swatman (1997a) focuses on e-commerce enabled integration within internal systems only. However the influence of external trading partners and environment are unaccounted for in their model.

The interest in e-commerce research has attracted considerable research attention in the past decade. Early e-commerce models (Kalakota & Whinston, 1996; Zwass, 1998;reflected the systems and processes of large organisations. The emergence of e-commerce models specifically for SMEs started to appear at the end of the millennium. The SME e-commerce models reflect different areas of e-commerce research. These include the adoption of e-commerce models (Bento &

Bento, 1996; Burgess & Cooper, 1999), business relationship models (Poon & Strom, 1997; Lymer *et al.*, 1998), e-commerce maturity models (KPMG, 1997; Grant 1999) and to lesser extent models of e-commerce integration (Poon & Swatman, 1997a). Most of these models are conceptual in nature and have yet to be empirically validated.

2.10 A Review of the Literature after Data Collection

Prior to data collection the IS literature specifically addressing SME e-commerce was limited particularly within the Australian context. In keeping with the interpretative approach undertaken by this research the findings of this study are enfolded with the emergent literature since data collection. A detailed review of this literature is conducted in Chapter 6 (Section 6.8). In the following section a limited overview of the emergent literature that has surfaced since data collection.

Chambers and Parker (2000) extended the MICA model developed by Burgess and Cooper (1999) by including motivation and inhibiting factors. In a review of the travel sector Bull and Standing (2000) developed a e-commerce business comprising of eight key components, which are associated with the core e-business strategy. The component model consists of an organisational structure, management style, customer service and support, partners and alliances, personnel, marketing, distribution and product or service elements.

Based on e-commerce and small business literature, Chong and Bauer (2000) adapts Rodgers (1983) four categories of technology adopters, to propose an e-commerce adoption model for SMEs that indicates that SME adopters and non-adopters of e-commerce are influenced by a range of factors.

Research by Mehrtens *et al.* (2001) investigated why SMEs adopt the Internet, preliminary findings suggest that SMEs adopt the Internet for perceived benefits, organisational readiness and external pressure. However it was noted that the level of organisational readiness and external pressure for the adoption of the Internet and associated technologies differed to past research distinguishing the factors affecting the adoption of EDI.

A *Stages of Growth for e-Business* model developed by McKay, Marshall & Prananto, (2000) combines KPMG's (1997) E-Commerce Maturity Model and the IT maturity model outlined by Galliers & Sutherland (1994). The model suggests that as the organisation's sophistication of e-commerce and IT matures, the chance of reaching electronic business maturity increase.

Recent research by Levi and Powell (2002) suggest the SMEs do not necessarily follow a single IS transformation pathway in relation to e-business transformation. Based on Venkatraman's (1994) five levels of business transformation their model of e-business transformation suggest that e-business related organisational transformation by SMEs can take at least four distinct transformation pathways.

As the use of SMEs becomes more sophisticated the development of models resonating these changes also evolve. This section highlights several models that have appeared in the literature subsequent to data collection reflecting the dynamic use of e-commerce by SMEs. These models illustrate the evolution of e-

commerce adoption models to include new SME models of e-commerce/e-business maturity and business transformation models.

These emergent IS models and theories relating to SME e-commerce are examined in more detailed in the last section at the end of Chapter 6.

2.11 Summary Reflections

This chapter has presented an overview of the literature on a range of areas relating to the use of e-commerce by SMEs. The review of the literature raises a number of issues that affect the ability of researchers to study SMEs and e-commerce:

- The lack of a universal definition of e-commerce makes it hard to examine and explore the applications of e-commerce when different individuals, organisations and academics define e-commerce to represent so many meanings.
- The problems of definition are not only contained to the term e-commerce. When researchers explore the literature on SMEs they are faced with an array of different classifications of the SME business group depending on which regional location you are based in. The United States classification of SMEs differs significantly to the European and Australian SME classification. This makes it difficult for Australian researchers to compare and contrast SME literature that has emanated from the U.S. and Europe.
- Researchers have long acknowledged the disparity between large and small businesses. The use of IS models and theories that have been developed from large organisational experiences needs to be treated with caution when applied to smaller organisations such as SMEs. SMEs are different to large organisations and as such require their own set of IS exemplars.
- There is a substantial body of literature concerning the factors that affect the adoption of the Internet and e-commerce by SMEs. The potential e-commerce benefits, inhibitors and opportunities have be well reported by researchers.

Since the data collection for this study, a number of SME e-commerce models have emerged however many of these are yet to be validated. Within Australia, an exploration of how SMEs are actively using e-commerce and the factors affecting the use of e-commerce has attracted limited attention particularly when this study began prior to the new millennium. A review of the literature suggests there exists an inherent gap in the IS research of e-commerce models and theories that have been empirically validated for SMEs.

This research aims to explore the utilisation of e-commerce among SMEs. The objectives of the research aim to seek: why e-commerce is used by SMEs; how SMEs are actively using e-commerce, what impact e-commerce has had on these businesses, the factors that affect the ability to conduct e-commerce and problems that have occurred as a result of using e-commerce.

This research aims to determine what is a suitable framework to explore the utilisation of electronic commerce amongst SMEs in Australia?

The research also aims to determine what factors influence the utilisation of electronic commerce amongst Australian SMEs?

3. METHODOLOGY

3.0 Introduction

This chapter provides the details of the research methodology used in the conduct of this research. The chapter addresses the philosophical stance adopted, the research strategy and procedures employed, the data analysis techniques applied and outlines the approach to the interpretation and discussion of the research.

- The first section of this chapter addresses the philosophical position adopted. A subjective ontology utilising an interpretative epistemology was embraced as the most appropriate for the exploratory nature of this research.
- The second section addresses the research strategy employed in the study. Qualitative multiple case studies were deployed as the most appropriate approach for gathering rich data on participants' meanings, experiences and contexts in this emerging research area. By conducting multiple case studies this research strategy also provided an opportunity to investigate the relationships in, and between the SMEs studied.
- The third section addresses the specific research procedures employed to collect the data used in developing the case studies. A series of face-to-face interviews were conducted with owners/senior managers in the thirty-four SMEs via a semi-structured question frame. This type of question frame provided both structure and flexibility in gathering SMEs' experiences and participants' attitudes and meanings concerning the utilisation of e-commerce. Questions were structured around the following topics: the SMEs business background; their current use of e-commerce; and the impacts and problems arising from the utilisation of e-commerce.
- The fourth section describes the application of two qualitative data analysis techniques to analyse the interview transcripts. This approach leverages the combined strengths of grounded theory and domain analysis to reveal the conceptual complexity in the data and to identify the semantic relationships that exist within and between the data. Initially, transcripts were analysed using high-level grounded theory open, axial and selective coding procedures. These codes were then deployed as part of a further examination of the transcripts to construct summaries for each case. These summaries, act as the basis for the development of domain analysis worksheets. The domain worksheets reveal the semantic relationships between codes, concepts and themes across the multiple case studies complementing the initial use of grounded theory.
- The fifth section of this chapter outlines the approach taken to interpretation and discussion of the research. The chapter concludes with a summary reflection on the research methodology.

3.1 Research Philosophy

3.1.1 The Ontology

This research is of an exploratory nature seeking to explore the utilisation of e-commerce by SMEs. A subjective ontology utilising an interpretative epistemology was embraced as the most appropriate for the exploratory nature of this research. Exploratory research is useful to "become familiar with the basic facts, setting, and concerns" (Neuman, 2000:22). A review of the SME e-commerce literature indicates that early research strategies predominantly consisted of surveys and to a lesser extent interpretative case study techniques. The use of surveys is frequently linked to research that is of a descriptive nature.

Neuman (2000:22) suggest that descriptive research is useful to "create a set of categories or classify types", "clarify a sequence or steps or stages" and to "report on the background or context of a situation". These elements of descriptive research fit well within the aims and objectives of pioneering researchers in this emergent research area.

However the use of research strategies employing a positivistic epistemology displaces much of the rich, detail insight into the apparent phenomena. The individual(s) managing the organisations, particularly in the case of SMEs, explicitly dictates how the business processes operate and perform. In this research, the ontology follows that of a 'subjective idealism' where each person is considered to construct their own reality (Archer, 1988). In order to gain a rich insight into the evolving domain of SME e-commerce, a research philosophy using a subjective ontological approach is considered most fitting. A key objective in this research is to explore the reasons why and how SMEs are utilising e-commerce (Section 1.2.1). Given the nature of the research questions proposed in this study it is appropriate to employ an interpretative epistemology. To try to gain a deep insight of the issues and factors surrounding the active use of e-commerce by SMEs, and to gather the views and opinions of participants regarding their e-commerce actions.

The use of interpretivist research methods in Information Systems (Walsham 1995a; Myers 1997; Klein & Myers 1998) has been acknowledged as a suitable approach particularly with research studies pertaining to organisational behaviour (Myers, 1997).

3.1.2 An Interpretative Epistemology

This research aims to explore in detail the actions and interactions of SMEs incorporating the use of e-commerce within their organisation. Interviews with key members of management were conducted to identify factors that contribute to and influence the uptake of e-commerce among SMEs. An interpretative research approach was considered the most appropriate means to identify and analyse factors within an organisation and the interactions between organisations. The interpretivist approach is based on an ontology in which reality is subjective, a social product constructed and interpreted by humans as social actors according to their beliefs and value systems (Darke *et al*, 1998).

Interpretivism seeks relevance in the research (Keen 1991) by explicitly including investigation of the context of the phenomenon under study. The interpretive research philosophy is increasingly being adopted in IS research as a plausible research approach to understand the contextual interactions within an organisation and externally with regard to its environment (Doolin 1996).

Utilising an interpretative approach for this research ensures that the researcher gains a deep understanding of the phenomenon under study while acknowledging the associated subjectivity. Alternatively a positivist approach uses experimental or statistical controls to minimise experimental bias and assure objectivity but in order to achieve this goal the contextual aspects of the data are removed for the sake of generalisable and reproducible results (Kaplan and Duchon, 1988).

This study is of an exploratory nature and it is the intent of the researcher to examine the rich contextual data as much as possible without forming any preconceived ideas. It would not be appropriate to strive for objectivity and testability at the expense of forgoing the chance to highlight the context and conditions in which the study is conducted. The nature of interpretative research is such that the researcher does not enter a social setting with a priori constructs, but allows constructs to emerge whilst the researcher is in the field learning about and trying to understand the phenomenon. It is intended, by using an interpretivist epistemology, to "understand phenomena through accessing the meanings that participants assign to them" (Orlikowski & Baroudi, 1991:5).

3.2 Research Strategy

This section will address the research methods and strategies used to conduct this study. The process of data collection utilises multiple case studies based on an interpretivist approach. As this research is of an exploratory nature a multiple case research strategy is deemed appropriate in order to gain an in-depth understanding of the context or phenomenon (Cavaye, 1989). It is considered that case study research is highly suited to studying phenomena that has no well *priori* constructs and relationships. The information gathered from the multiple case studies will explored by a hermeneutic interpretation of the data using qualitative research methods. The research methods and strategies adopted by this research follow the chosen ontology discussed in the previous section.

3.2.1 Research Method

This interpretive study aims to gain an insight into the e-commerce activities performed by SMEs. The research strategy and methods employed to collect this information relies upon the use of:

- Multiple case studies and
- Qualitative research methods.

A discussion of the use of multiple case studies and inductive theory building is presented in the next section. An overview of the types of qualitative research methods and hermeneutic processes is also explained.

3.2.1.1 A Case Study Approach

The examination and understanding of the context in which e-commerce is used by SMEs is particularly important when the research is of an exploratory nature. This is indicative of areas where there is little understanding of how and why processes or phenomena occur, or where the experience of individuals and the context of actions are critical (Benbasat *et al.*1987; Darke *et al.*, 1998). The theory surrounding the use of e-commerce by SMEs is not well developed, as the phenomenon is dynamic and not yet mature or settled. This is evident in the e-commerce literature where terminology and a common language and set of definitions are not yet clear or widely accepted (Darke *et al.*, 1998).

The application of a case study research strategy is considered a plausible and accepted research strategy in Information Systems research (Lee 1989) where research and theory has been formulated at an early stage with little theoretical base (Galliers & Land, 1987; Cash *et al.*, 1989 and Galliers, 1992). Previous researchers Benbasat *et al.*, (1987) and Myers (1998) acknowledge that case study research is most appropriate for the study of information systems development, implementation and use within organisations.

Case study research may involve a positivistic (Benbasat *et al.* 1987; Yin 1989; Lee 1989) or interpretative epistemology either employing quantitative, qualitative or a combination of the two research methods. Although past IS researchers have used case study research in a positivistic manner there has been a notable increase in an interpretivistic use of case study research (Walsham, 1995).

Interpretative case studies have been widely used in the social sciences (Silverman, 1998), and are gaining wider acceptance in the Information Systems arena. Although Yin (1984) supported the use of case research from a positivist view, his belief that case studies can be best used to explore "how" and "why" questions supports an interpretivist approach to using case study strategy (Walsham, 1995).

The case study approach has the capacity to bring four dimensions to interpretivist research (Urquhart, 1999). It has the ability to:

- produce rich insights from the data,
- draw specific implications,
- develop concepts within the data
- and provide a base to generate theory.

A well-organised case study database provides the foundation for cross-referencing data citation of relevant evidence as part of this process. A research strategy based on the case study approach provides a coherent strategy, validated by other IS researchers, to explore the use of e-commerce amongst a range of SMEs. The study incorporates the use of multiple case studies to improve the validity and reliability of the data.

There are several facets associated with case study research. Cavaye (1996) suggests that case study research can take an inductive or deductive research approach. This research exploring the use of e-commerce by SMEs utilised a

multiple case study research method with an inductive interpretative research approach.

3.2.1.2 Multiple Case Study Approach

The use of multiple case studies as opposed to a single case study provides the researcher with an opportunity to observe the research phenomenon in different settings. The multiple case study approach allows the cross comparison of, and analysis from, multiple sources (Darke *et al.*, 1998). There are no specific guidelines determining what is an appropriate number of cases to use, however it is beneficial to utilise multiple cases in this research as the use of SME e-commerce is an emerging research area. Eisenhardt (1989) suggest the number of required case studies depends on how much new information is likely to be gained by the addition of extra cases to the research.

As this research is based on small and medium sized enterprises (SMEs) and this business category includes a wide cross section of business sizes it is important to incorporate a number of cases that can provide an appropriate representation of the SME classification. This study utilises thirty-four cases studies.

3.2.1.3 The Rationale for the Multiple Case Study Using a Case Study Approach

The advantage of using multiple case studies is that it may provide literal replication Yin (1994) and opportunities for natural generalisation. The analysis of multiple cases may increase theoretical replication where results are similar and other cases can be selected to produce contrasting results for predictable reasons (Darke *et al.*, 1998). Other strengths of case study research strategies include the ability to study a phenomenon in a natural context, and to study a large number of issues and different aspects related to the phenomena. Multiple case studies provide an avenue to develop and refine concepts for further study and enable researchers to compare concepts in different contexts (Cavaye 1989).

3.2.1.4 Inductive Theory Building

Inductive theory building historically evolved from a collection of work by researchers in other disciplines. The most notable influence is the contribution by sociologists Glaser and Strauss (1967), who developed an alternative to hypothesis theory building by using inductive qualitative research. The concepts and themes emerge directly from the data in contrast to predefining groups or categories imposed upon the data (Urquhart, 1999).

Central to inductive theory building is the notion that the theory emerges as the researcher collects data surrounding the phenomenon. It is important that the researcher enters the field without a priori hypotheses, but with a good understanding of the current and historic literature. The inductive theory building approach involves the collection of the data gathered from the multiple case studies, which then is coded and categorised to facilitate abstraction and theory construction. The analysis of the data begins during data collection as patterns emerge, as a consequence this may entail further data collection. The process of data collection, analysis, and theory generation is guided by theory as it emerges.

In recent times Eisenhardt (1989) has extended the body of knowledge developed by Glaser and Strauss (1967), Yin (1981, 1994) and Miles and Huberman (1984) to produce a framework of inductive theory generation using case study research. Although this work was developed from a positivistic perspective, the issues are highly applicable to the interpretative inductive theory generation approach underlying this study. Eisenhardt's roadmap to inductive theory generation involved an iterative process that was closely associated with the data. It described the process of inducting theory by combining qualitative data, inductive logic and case study research.

The research presented in this thesis adapts the inductive theory building approach developed by Eisenhardt's (1989). However this study differs by incorporating an interpretative epistemology. A review of the literature provides a basis for some broad constructs without formulating any prior hypothesises. A cycle of data collection and analysis begins with subtle changes in the data collection as patterns emerge. The development of theory is inductive, facilitated by the recursive process of data collection and analysis. A final process of cross comparisons with other cases is undertaken to strengthen and substantiate the theory generated.

The table below shows how the research strategy employed by this study is an adaptation of Eisenhardt's framework. The first two columns of Table 3-1 outline Eisenhardt's (1989) process of inductive theory building. The third column in Table 3-1 discusses the stages of inductive theory building utilised in this research.

Table 3-1. An Outline of the Stages of Building Theory: (An adaptation from Eisenhardt (1989) which appeared in Urquhart (1999))

Step	Activity	Process used in this study
Getting Started	Definition of research question Possibly a priori constructs	A broad research question was formulated. "What is a suitable framework to explore the utilisation of e-commerce amongst SMEs?" A review of the literature highlighted some broad constructs.
Selecting Cases	Neither theory nor hypotheses Specified population Theoretical, not random, sampling	A range of case studies were selected to represent the broad category of SMEs incline to use e-commerce. The selection criterion for the cases was theoretical.
Crafting Instruments and Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple Investigators	Face to face interviews, organisational information and telephone conversations were used for data sources. Qualitative data was recorded during the collection process. A single investigator was responsible for the data collection.
Entering the Field	Overlap data collection and analysis including field notes Flexible and opportunistic data collection methods	Initial data collected from pilot case studies were analysed and influenced subsequent design of the main case studies. The subsequent interview transcripts were collated for data analysis.
Analysing Data	Within-case analysis	The combined approach to data analysis using ground theory and domain analysis

	Cross-case pattern search using divergent techniques	provided a coding methodology and mechanism for data analysis across all cases.
Shaping Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	An iterative process of coding within and across cases formulated the theoretical structure. This was compounded by an in-depth examination of inter-relationships within cases that was compared across all cases.
Enfolding Literature	Comparison with similar literature	A comparison of existing literature was used to compare and contrast the research with emergent theory
Reaching Closure	Theoretical saturation when possible	Theoretical saturation was accomplished by combining the analysis of cases across all cases.

3.2.2 Qualitative Research Design

The role of e-commerce is evolving at a considerable rate and as a consequence the diffusion of e-commerce technologies increases substantially each year. The impact of e-commerce within organisations directly or indirectly influences the value chain proposition, business strategy, and management and customer relations. As the evolution of e-commerce changes, the factors and issues driving change are important. This study aims to explore the issues and factors behind the utilisation of e-commerce. To understand these organisational changes the use of an interpretative epistemology with a qualitative methodology is adopted in this research.

A qualitative research approach endeavours to determine meaning and understanding of a phenomenon rather than quantifying and measuring the apparent phenomenon. Neuman (2000:144) considers "the language of qualitative research is one of interpretation". An important part of qualitative research is to record the context and relationships that exist within the phenomenon. Unlike quantitative research methods the data collection and analysis in qualitative research methods may be combined into one continuous action so that any emergent theory is grounded in the data (Marshall & Rossman 1995).

A qualitative research design based on multiple case studies was favoured as the best means by which to capture the richness of the information, operational environment and the culture of the participating SMEs. Other researchers such as Yin (1984) and Benbasat *et al.* (1987) have previously discussed the merits of using multiple case studies to provide replication logic and rich descriptions of emergent research areas.

Although Yin (1984) supports the use of case research from a positivist view, his belief that case studies can be best used to explore "how" and "why" questions supports an interpretivist approach to using the case study strategy (Walsham, 1995b). Zikmund (1997) has justified and validated multiple case study analysis for investigations into the use of inter-organisational information systems.

3.2.2.1 Conducting qualitative research

As this study focuses on the interpretation of the interview transcript, a recursive process of interpretation and reinterpretation of the text is employed. The task of

the researcher is to reveal insight and meaning within the text. This requires the researcher to read "between the lines" and extract the underlying meaning of the text as opposed to what is found on the surface. The process of examining the text also adds an element of subjectivity (the influence of the researchers own viewpoint) during the analysis stage.

The role of the researcher in this study is one of an outsider-observer. The researcher is considered external to the organisation's personnel; as a consequence the process of collecting and interpreting the data by the researcher is open to subjectivity. The advantage of being an observer external to the organisation is that information can be devolved in an open, frank but confidential manner provided a level of trust is established.

In this research the qualitative research methods examine the interactions between individuals within the organisations and those external to the organisation. The examination of the information conducted in interviews also includes the analysis of other field observations, printed media, and online information (eg. web site functionality). The comparison of texts and other relevant material across multiple sources further substantiates the quality and reliability of the meanings inherent in the text. The cycle of examination and re-examination of text is considered part of the qualitative inductive data analysis cycle.

3.2.2.2 Studying Conversation

The interview process involves an interaction between the participant and the researcher. The communication cycle involves a four step process of encoding and decoding (Foddy, 1996). The researcher encodes the question, which is then decoded by the participant. The participant then encodes an answer, which is decoded by the researcher. If participants have difficulty answering questions they may draw upon four possible elements in the interview for guidance (Foddy, 1996). These may relate to: what was said or information gained from previous answers and questions; how questions have been worded; a set of response options provided with the question; or the context of what the interview is about.

Potential problems can occur if participants from different cases react differently as they attempt to answer questions. To minimise these problems the questions were phrased in clear specific terms and a reason for asking the questions was provided so participants were not incline to resort to contextual clues within the interview to answer the questions. The use of pilot interviews provided a valuable step to refine the interview process and question frame. An explanation of the purpose of the research and a definition of e-commerce used in the study were provided to help reduce any potential confusion with elements of the interview.

3.3 Research Procedures

The case study interviews are the central method for the collection of data. A semi-structured question format was applied to extract key information about the organisation's use of e-commerce. The selection of the cases was conducted to provide a representative group of SMEs that were actively utilising e-commerce. The design of the question format was validated with a series of pilot interviews

to ensure that the data received from the interview process was meaningful and as non-ambiguous as possible.

3.3.1 The Question Format

A semi-structured question format was used to gather information about the utilisation of e-commerce within the organisations taking part in this research. The questions were formulated to encourage participants to discuss issues relating to the study without imposing limitations or constraints on how the questions may be answered (Doolin, 1996). The questions were arranged into four broad sections.

- Section 1: Business Background

The aim of the first section of questions was to collect background information about the organisation. Questions were framed to determine core product or services the organisation provide, the size of the organisation, customer market and an indication of the historical profile of the business.

- Section 2: Current use of e-commerce

The questions in the second section focused specifically on the current use of e-commerce by the SME. For example, what were the drivers to use e-commerce and how is the organisation's web site currently used? Further questions were also asked about other e-commerce technologies that may be in place, for example a discussion of electronic banking facilities and electronic payment systems.

- Section 3: Impact of e-commerce

Section three questions were asked to explain the impact of e-commerce activities on business operations. Questions were posed to illicit the importantance of e-commerce and the Internet to the organisation and to determine the any changes in the business processes within the organisation and external to the organisation.

- Section 4: Problems encountered using e-commerce

Section five questions were aimed at identifying problems that may have been encountered incorporating and using e-commerce. For example, problems may have appeared during the incorporation of e-commerce and problems that appear while conducting e-commerce activities. The final section also includes questions asking participants about the future of their e-commerce activities. An outline of the semi-structured questions is included in Appendix Three (pp.247).

3.3.2 Location of the Study

Tasmania and Western Australia were selected as suitable research locations due the high proportion of small businesses that were using computers and accessing the Internet in comparison with other States of Australia (Australian Bureau of Statistics, 1999a). The logistics and costs of conducting the research in Tasmania were reduced due to the small geographical size of the state. Western Australia was also chosen as second source of SMEs to minimise any potential geographical prejudice amongst the participants. Both states are geographically remote from the major capital cites of Australia, located on the Eastern seaboard of Australia. The decision to select two groups of SMEs is for comparative reasons, strengthening the underlying theory proposed in this research. The inclusion of case studies from two independent states in Australia increases the rigour and validity of this

research in the Australian context. Increased rigour is achieved by enlarging the number of cases included in the study leading to an increased quantity of data. An increased level of validity follows as the data is collected from two separate areas in Australia. The trading environment, supply chains and the customer bases for each group of participants are autonomous, assuring greater validity in the findings of this research.

3.3.3 Case Selection

The businesses that participated in this research were representative of the micro, small and medium Australian SME classification. The size of the businesses included husband and wife operators to medium sized organisations employing over 60 full time staff. The businesses included in the SME classification encompassed organisations from traditional industry sectors that are deemed to be high user of technology. With reference to the ABS report on Small Business Technology Usage (1999) SMEs were selected from the top ten industries most likely to adopt e-commerce.

When the data collection began in 1999 the identification of SMEs actively using e-commerce was difficult. The task to identify these organisations was complex and several methods were employed to gain an insight into finding suitable cases. The methods used to identify suitable organisations included an inspection of online business registers to gauge a level of e-commerce activity amongst listed organisations and a preliminary review of their web sites to determine the suitability of the organisation.

The web sites of Internet Service Providers (ISPs) and web developers were also examined for client lists and testimonials. These were examined and reviewed as possible locations for suitable cases. A third selection procedure entailed approaching web developers in Tasmania and Western Australia for a list of clients that they recommend as active users of e-commerce.

The main criterion of the selection process was to determine if an organisation was actively using some form of e-commerce. Once a suitable set of organisations was identified each organisation was sent a letter of introduction outlining the purpose of the research and an invitation to participate in the research. A total of forty-five SMEs spanning across Tasmania and Western Australia were approached to take part in the study.

The businesses under study come from of nine industry sectors that include agriculture, education, finance, hospitality, ICT, manufacturing, mining, retailing, and wholesale trade. At the time of data collection these industries were considered to represent a substantial proportion of SMEs engaged in e-commerce activities. In Table 3-2 and Table 3-3, a summary of the organisations included in this research is presented below.

Table 3-2. Tasmanian Cases (18):

Case ID	Description	Industry	Age (years)	Size
A	Angus Stud Breeder	Agricultural	80	3
B	Scientific Software Supplier	Agriculture & Fishing	2	2
C	City Restaurant	Hospitality	2	3
D	Software Distributor	ICT	2	5
E	Distributor for Apparel and Work wear	Wholesale	15	19
F	Inner City Hotel	Hospitality	12	14
G	Fruit Tree Grower	Agricultural	1	4
H	Web Developer / Consultant	ICT	7	8
I	Mining Communications	Mining	11	27
J	Fishing Lure Manufacturer	Manufacture	9	9
K	Insurance Loss Adjuster	Finance	12	18
L	Computer Consultant	ICT	8	3
N	Essential Oil Wholesaler	Agriculture	3	8
O	Retail Bakery	Retail	14	26
P	Fish Farmer	Fishing	14	65
Q	Fruit & Vegetable Wholesaler	Wholesale	20	25
R	Credit Information Services	Finance	35	42
S	Wholesale Bakery	Manufacturer	45	49

Table 3-3. Western Australian Cases (16):

Case ID	Description	Industry	Age (years)	Size
T	Flower Shop	Retail	4	1
U	Education Marking Services	Education	5	2
V	Craft Wholesaler / Retailer	Wholesale / Retail	15	1
W	Web Developer	ICT	2	4
X	Educational Products	Education	1	2
Y	Online Miscellaneous Retailer	Retailer	1	2
Z	Web Developer	ICT	3	12
AA	Online Stationery Retailer	Retailer	1	8
AC	Communication Product Distributor	Wholesale	7	45
AD	Web Developer	ICT	6	45
AE	Agricultural Information Provider	Agriculture	5	21
AG	Web Developer	ICT	2	4
AH	Online Bookshop	Retail	6	2
AI	Entertainment Retailer	Retail	10	2
AJ	Online Specialist Bookshop	Retail	4	4
AK	Web Developer	ICT	2	4

A detailed synopsis of each case study is provided in Appendix Four (pp.249).

3.3.4 Data Collection

3.3.4.1 Selecting the Participants

A letter of introduction was mailed to each prospective SME. The letter was addressed to the manager or owner. If a mail address was unobtainable, an e-mail message was sent containing the content in the letter of introduction. In most cases the contact details for the organisations were obtained from the organisation's web site. If these details were unattainable a phone call to the organisation was made requesting the name of the managing director and mailing details. If the identity of the organisation could not be ascertained from the local

telephone directory and e-mails received no response, the organisation was removed from the list of prospective cases for this research.

The letter of introduction outlined the purpose of the study and invitation to participate in the research (Appendix Two. pp.246). Confidentiality was assured in accordance to the guidelines approved by the Ethics Committee at the University of Tasmania. Each prospective organisation was contacted by the phone or e-mail a few days after the letters / e-mails were sent. The researcher asked to speak to the owner/manager of the organisation to seek confirmation that the letters had arrived and to determine their willingness to participate in the study. If these people confirmed their willingness to participate in the study, a brief discussion of their e-commerce activities was held at the close of this contact a convenient time to conduct the interview was scheduled. In some cases the owner / manger did not wish to participate in a face-to-face interview and preferred to organise a phone interview instead. Notes were taken during the phone interview and typed up into a format ready for transcription. From the initial forty-five organisations selected, thirty-seven indicated that they were willing to participate in the research. Some time after the interviews were conducted three cases signalled their desire to be removed from the study (Case M, Case AB and Case AF).

3.3.4.2 Organisations involved in the Case Study

The participant organisations were located in two states of Australia, Western Australia (WA) and Tasmania (TAS). The organisations involved in this study were representative of the small, medium and micro categories under the SME classification. Cases from both WA and TAS were included in each SME classification.

The breakdown of SMEs according to their size is summarised in the Table 3-4 below. The researcher decided to categorise small businesses into two groups. Those businesses employing less than five individuals were to be classified as micro businesses and those businesses from the non-manufacturing sector employing five or more but less than twenty individuals was considered to be small businesses. Business from the manufacturing sector employing five or more staff but less than one hundred full time staff are considered small business. Businesses employing more than twenty individuals but less than two hundred were defined as medium sized enterprises This was considered appropriate to coincide with the Australian Bureau of Statistics (Australian Bureau of Statistics, 1999) classification of SMEs.

Table 3-4. The number of SMEs included in the Study

SME Categories	Tasmanian	Western Australia
Micro Business	6	11
Small Business	7	2
Medium Enterprise	5	3

3.3.4.3 Pilot Interviews

Four pilot studies were conducted to test the design of the question format and to ensure that the questions were not ambiguous. The pilot studies were conducted using the same procedures proposed for other participants discussed in section 3.4.4.1. The use of pilot studies refined the proposed set of semi-structured questions into a standardised set for use with other case study participants. As a result of the pilot studies it was decided to provide a broad definition of e-commerce to participants prior to the interview. It was apparent in some pilot studies that some participants believed e-commerce related only to the use of the organisation's web site where other e-business activities were not considered to be e-commerce. For example, the uses of electronic banking or electronic bill payment systems were commonly not considered e-commerce functions. It was important to establish a definition of e-commerce so that the researcher and the interviewee shared a common understanding of the term. This is important as individuals can define e-commerce in different ways. If the researcher is not aware of this the ability to interpret the data and make comparisons across cases becomes trivial (Foddy, 1996).

3.3.4.4 The Interviews & Transcripts

The interview process started with the researcher providing information about the research aims and objectives (Section 1.2.1) and definition of e-commerce as defined in Chapter 2 (Section 2.2). Participants in each face-to-face interview were asked if the researcher could record the conversation on a tape recorder. In all cases permission was granted. A total of thirty-one participant interviews were conducted face-to-face with the participant while three interviews were performed using the telephone.

The initial set of questions (Section 3.3.1) was designed to be easy to administer, understand and answer. The first section of the interview gathered background information about the organisation. Some answers unexpectedly provided an insight into the background of the participants as well. These questions served as 'ice breakers', relaxing the participant and improving rapport with the interviewer.

The duration of each interview was about an hour. Each interview was generally conducted on site however some interviews were conducted at other premises. In three cases the participant wished to conduct the interview on the phone. In this case notes were taken during the interview process at the conclusion of the interview the researcher reflected on the conversation and retained personal comments and thoughts about the meeting along with the interview transcript interview notes. These were later collated and re-organised into a format ready for data analysis.

At the end of each interview the researcher checked through the major points of the interview with each participant. This was to ensure that the information was correct and reduce the chance of misinterpretation. At the completion of the interview a transcript was constructed in preparation for data analysis. For those interviews that were not recorded on tape a written log of the interview was produced. If any inconsistencies or ambiguities appeared during the preliminary

data analysis the researcher contacted the interviewees to clarify any points of confusion.

3.3.4.5 Validating Cases

Each business included in the research, including the pilot cases, was contacted after the interview had been transcribed to validate the content of the interviews. The interviewees were asked to check the transcripts for errors or misrepresentations. This procedure ensured a level of validity was maintained throughout the research with each of the case study participants.

3.4 Data Analysis

This section describes the approach taken to the analysis of the interview transcript data. Drawing on the principles of grounded theory and domain analysis this analysis combines two qualitative data analysis techniques. These methods utilise an inductive approach to theory generation whereby theories, concepts and models are derived directly from the data or grounded in the data. The inductive theory building process relies on an iterative cycle of reading and re-reading the qualitative data to detect emergent themes and constructs embedded or grounded in the data (Neuman, 2000).

The combined approach to qualitative data analysis is detailed along with the steps deployed to combine the two methods. Combined, these methods provide a mechanism to reveal both the conceptual complexity in the data and the semantic relationships that exist within and between the data across the multiple cases. In presenting the analysis this section also describes how three case studies are used to exemplify the procedures employed in this combined approach. Initially, the transcripts of each case are coded using high-level open, axial and selective coding procedures. This condenses the volume of the data and enables the conceptual complexity within the data to become visible. Chapter 4 provides a detailed outline of the high-level grounded theory approach to the first part of the data analysis. Using these codes to navigate, the transcripts are revisited and thirty-four case summaries developed. These case summaries contain transcript terms that can be associated with the codes developed in the initial analysis. These summaries serve to link the two methods by enabling the development of the domain analysis worksheets. These worksheets reveal the semantic relationships between the concepts and themes across multiple case studies. Chapter 5 presents a detailed overview of the domain analysis technique used in the second part of the data analysis.

3.4.1 A Combined Approach to Data Analysis

This thesis provides a methodological contribution to the development of qualitative interpretative IS research methods by combining grounded theory and domain analysis techniques in the analysis of multiple case studies.

The combined approach leverages the strengths of ground theory and domain analysis. Grounded theory provides an essential device to condense the vast volume of data gathered for each case and the coding procedures intrinsic to grounded theory highlight the conceptual complexity within the data. However a problem that exists with the grounded theory method is determining when to stop the reiterate coding operations inherent in this approach (Urquhart, 1999).

In this context domain analysis complements the use of grounded theory by providing a method to contain the repetitive inspections of the data associated with grounded theory. The creation of case summaries link codes derived in the initial data analysis with terms from the transcripts. Drawing upon these case summaries, domain analysis complements and extends the initial data analysis by distinguishing the semantic nature and meaning of the inter-relationships ensuring an enhanced insight into the relationships between codes, concepts and themes. Significantly domain analysis provides a method for a collective comparison of multiple cases while retaining a high degree of richness and meaning associated with concepts, themes and relationships across all cases. The composition of the domain analysis aggregate worksheets formulates an integral document for the interpretation and discussion of the data.

3.4.2 The Use of Three Case Study Examples

To illustrate the data analysis procedures employed in this study three representative case examples from the thirty-four cases are used to reflect the different types of SMEs participating in this study. The analysis of the three case examples, a micro, small and medium enterprise, is presented in detail to illustrate to the reader the combined qualitative data analysis process used with each of the thirty-four businesses involved in this research.

Case X represents a micro business that provides educational work sheets on-line. While a majority of their customers are located in Australia orders for their products do also emanate from overseas. A branch office is located in the United Kingdom. Their e-commerce system was developed in-house and had at the time of data collection been operating for a year.

Case E is a small business wholesale apparel supplier that has been trading for over 30 years. The company distributes a range of clothing products to various businesses and corporate customers throughout Tasmania. Their e-commerce system is used to streamline customer inquiries and facilitate online order and sales management. E-commerce consultants and developers established the e-commerce system in liaison with the business and it's core customers.

Case R is a medium sized enterprise that provides financial information to a wide range of businesses, mainly within Tasmania, but also on the mainland Australia. A sophisticated e-commerce system was been implemented to automate the provision and delivery of financial reports. Registered clients are able to interact directly with the business's information system, providing up-to-date information twenty-four hours a day. The system was developed jointly in-house and with the aid of external web developers.

Chapter 4 illustrates the application of a high-level grounded theory approach to show the identification of emergent open, axial and selective codes. In Chapter 5 the three case examples are used again to illustrate the development of domain analysis summary worksheets which are used for a cross comparative analysis of the multiple cases in relation to each research theme.

3.4.3 The Use of High Level Grounded Theory

The use of a high level grounded theory analysis condensed the data and enabled the conceptual complexity of the data to be revealed in a series of core codes identifying key concepts, themes and relationships. Transcripts were initially analysed using high-level grounded theory open, axial and selective coding procedures.

Miles and Huberman (1984) suggested data analysis consists of three parallel activities. These include initially selecting the data to analyse, reducing that data to a condensed format and abstracting and transforming the data from its raw state. The process of collecting and analysing the data is a recursive process, which continues until no new innovative concepts emerge. The three tiers of coding functions are based on a grounded theory methodology as outlined by Strauss and Corbin (1990).

Strauss (1987) proposed an enhanced coding philosophy that looks deeper into the data for elements of meaning that were not readily apparent. Glaser and Strauss (1967) developed the notion of "grounded theory". Central to their methodology is the three stages of coding, open coding, axial coding, and selective coding. The grounded theory methodology is structured on the basis of continuous comparison of emergent theoretical categories. The approach put forward by Glaser and Strauss (1967) involves transforming the data to extract the underlying relationships and themes not apparent on the surface. That is, their coding criteria aimed to look beyond the codes that condense and categorise the data and look for links with other phenomena and dimensions. Typically the process of axial coding involves searching and recognising these possible associations and dimensions related to other phenomena.

Grounded theory is a research method that has been used by many qualitative researchers. The methodology has been acknowledged and adopted by several IS academics in recent years (Bowker *et al.*, 1995; De Vreede *et al.*, 1999; Hughes, 2000; Pandit 1996; Pettigrew 1985; Orlikowski 1993; Smit 1999; Urquhart 1996, 1997). Strauss and Corbin (1990) described grounded theory as " a qualitative research method that uses a systematic set of procedures to develop an inductively derived theory about a phenomenon" (Strauss & Corbin, 1990:24). Grounded theory is highly suited to exploratory research in the quest to find new theory. It proposes theory that is based on the evidence embedded in the data. The data are explored in terms of micro events that form the basis for explanations at a macro level (Neuman, 2000).

3.4.3.1 The Coding Process:

The data needs to be organised into a format that accommodates a flexible method for retrieving the most meaningful parts. Coding the data provides a mechanistic procedure to facilitate this. Categories are formulated by linking different aspects or instances of the data that have a shared commonality. These concepts may in turn be related to one another and so can be classified as emergent themes. The assortment of codes, concepts and themes are closely related to one another and are founded in the data.

Coding the data can be a method to simplify or reduce the data but it may also be used conceptually as data complication. Coding can be used conceptually to expand, transform, and re-conceptualise the data thus broadening the analytical boundaries (Coffey & Atkinson, 1996). This critical approach to data analysis expands the data at a deeper level of abstraction. Coding at this level is not merely about condensing the data but about exploring the data for extra conceptual frameworks or dimensions of analysis.

In practice, the process of coding involves both the reduction in data and data complication. While this study did not endeavour to expand and explore the possibilities of data complication it is acknowledged as a further coding dimension. Reducing the data to a condensed format involves a series of coding procedures. This study employed three levels of coding procedures (Strauss, 1987) transforming the raw data into a collection of concepts and relationships immersed in rich detail.

Each of the interviews was transcribed for further analysis. In order to reduce the large amount of data collected a set of coding procedures was employed to condense the data from a raw state. Three levels of coding were applied to each transcript. Initially high level open coding was applied to the data set, which revealed 78 core categories. The emergent core categories were further explored by using high level axial and selective coding procedures on the data set. This approach provided a deeper analysis of the data and a second set of codes supporting the initial constructs.

Open coding is the process of exploring the data without making any prior assumptions about what might be discovered. The open coding procedure involves the development of concepts and themes emerged in the data. The axial coding stage is used to organise and expand the theoretical framework inherent in the research by identifying linkages within the categories and between the categories. The selective coding stage aims to develop a structural relationship between the categories and sub-categories, which collectively provide the basis for the theoretical structure for the analysis.

The results of the coding procedure revealed numerous patterns amongst the core categories and sub categories. These patterns formed the basis for those factors identified as directly contributing to the development of heuristic models exploring the utilisation of e-commerce amongst these thirty-four SMEs.

Each interview was transcribed for coding. A reference point was assigned to each code to aid the retrieval of data for analysis. The data for each case study were coded at a high level to seek similar patterns amongst emergent constructs. Many of these terms were found to be recurrent across the cases. Preliminary codes associated to these constructs were recorded and emergent concepts were ordered and arranged into meaningful groups for further analysis

The coding process essentially condenses the bulk of the data into manageable units by associating categories with, and assigning them to, the data.

Open Coding
The first pass through the data involved the identification of initial topics and categories with the objective of consolidating the raw data from the transcripts and interview notes. Open coding required the researcher to inspect the transcripts and field notes looking for particular themes and terms embedded in the data that relate to the research objectives (See Section 1.2.1). These items were recorded for later reference and interpretation. The subsequent coding procedures explore and manipulate initial codes or possibly created new codes to best describe the emergent themes.

Neuman (2000) suggested that the list of initial themes compiled from the open coding have three purposes: the list of emergent themes are visible at a glance; it can prompt the researcher to identify themes in subsequent open coding processes; and the list will provide a basis for further analysis where themes can be manipulated, combined, segregated and expanded.

The open coding process aimed to identify topics that emerge from the data. The initial classification of topics was collated by exploring a combination of field notes, transcriptions and other recorded observations such as organisational brochures and web site information. Compiling a list of topics provides a reference for the emergent themes. It also aided in the comparison of topics across multiple cases and it provides a reference point to determine the categorisation of themes for subsequent coding sequences (Neuman, 2000).

Axial Coding:
This level of coding explores the emergent topics for patterns and similarities and exceptions amongst the different cases. A second pass of the raw data was conducted to inspect the data for possible relationships between open codes to identify conceptual peculiarities of emergent themes. Cases that support emergent patterns are recorded in the second level coding set along with the contextual elements associated with these occurrences. Notable exceptions are also recorded for further analysis. The second sets of codes are more succinct and defined than the initial set. These can also acknowledge emergent sub-categories that become apparent. This may arise when the interviewee provides multiple unrelated answers. In this case two or more subcategories would be recorded to capture alternate dimensions to the question.

The aim of axial coding is to explore the relevance and appropriateness of the initial set of open codes. New codes may appear during the second pass but the circumstances of the emergent themes are important. Sub-categories may be found that can illustrate different dimensions to the themes. The resultant axial codes strive to capture the environment in which the themes occur. Possible relationships between themes and associated concepts are recorded. These provide evidence to support the occurrence of the underpinning conceptual themes. Multiple occurrences of these relationships and concepts across individual cases further strengthen the emergent theme.

The second pass has restructured and refined the initial concepts and noted possible links and relationships within the core categories. The second pass

through the data set revealed twenty-four core codes. A third pass through the data set directly seeking information relating to the core codes is considered the process of selective coding.

Selective Coding:
This final pass of the raw data seeks to examine the contextual elements in a broader holistic sense. This involves a process of selective coding which aims to collate previous codes and other information directly associated with the major themes.

Selective coding re-examines the data and previous codes generated for cases to highlight particular themes. The selective coding process consolidates pertinent information about the core constructs to allow the researcher to explore, compare and contrast the underlying themes across cases or within a particular case. This final coding process focuses the analysis around particular well-developed constructs or theme areas. The use of the major constructs guides the search for more relevant information and codes that may reveal links and relationships amongst major themes. The researcher then compares the particular perspectives provided by the interviewees seeking patterns that may support or refute the themes under analysis.

The selective coding process examines the context of how questions were answered, and assertions and implicit meanings not apparent in earlier coding procedures are recorded. The selective coding approach aims to qualify the context of what is said with what is conveyed in actual language.

3.4.4 Case Summaries

The codes that emerged from the high-level grounded theory method were then deployed as part of a further examination of the transcripts to construct summaries for each case. These summaries fulfil two goals; they form the basis for the development of domain analysis worksheets and they link the two qualitative data analysis techniques.

These case summaries provided a concise synopsis of the interview process for each case. The structure of the analytic summaries was based upon the emergent categories identified in the first level of open coding. An example of a case summary is provided below:

Table 3-5. An Example of an Case Summary

Topic	Codes	Terms
T1	Business History	• Established 1992 • Started with 2 people and have grown nationally, 28 in Head Office • National Offices in all major cities • State managers, Account managers • Two shareholders, interviewee and partner
T2	Market Presence	• Focus on national market • Consider overseas market like New Zealand
T3	Employees	• 28 in Head Office • 45 Nationally

The case summaries provided a mechanism for the researcher to directly reference a specific area in the transcripts for detailed analysis. The codes and terms found in each case summary are used explicitly in the development of the domain analysis worksheets.

3.4.5 The Use of Domain Analysis

The use of domain analysis provides a mechanism to reveal the semantic relationships between, and the significance of, concepts and themes across the multiple case studies complementing the initial use of grounded theory. Domain analysis is closely associated with the grounded theory methodology (Urquhart, 1999). The analysis involves the systematic examination of the data with the intention of finding relationships amongst elements within the data and across the multiple case studies as a whole. As with grounded theory the domains are similar to concepts generated by the researcher from first level open coding, domain analysis involves the examination of 'in-vivo' codes based on language of the participants (Urquhart, 1999:57).

Data analysis using domain analysis identifies semantic relationships that exist within domains or between domains provides the researcher with the added benefit of a deeper insight into the inter-relationships between emergent themes. Urquhart (1999:57) suggested that the semantic relationships "allow a finer grained analysis of relationships between codes. These enabled an extension of causal conditions, intervening conditions and consequences given in the later version of the paradigm provided by Strauss & Corbin (1990)."

3.4.5.1 Domain Analysis

A qualitative data analysis approach using domain analysis offers a "comprehensive and innovative approach to analysing qualitative data" (Neuman 2000:429). Domain analysis can be used to explore and examine the language of the interviewees. The language is defined in terms of linguistic symbols used to record meaning and experiences. The symbolic references are not confined to language alone but may include facial expression, movement and actions. The fundamental unit of analysis is a domain, which consists of core abstractions. The process of analysis begins by investigating each domain then combining and

reviewing the individual domain analysis as a broader system to identify inherent themes in the research. In this study we draw upon the open codes derived in the initial data analysis to signify domains for analysis.

Each domain comprises of many categories of meanings that are classified as arrays of different objects. Domain analysis involves the exploration of linguistic symbols or core "folk terms" used by the interviewees. Three elements are generally associated with the linguistic symbols. One is the linguistic symbol itself, which includes the actual words used by the interviewee or terms relating to the research area. The referent is another element; things the symbols are referring to. The third element describes the relationship between the symbol and the referent(s). Coffey and Atkinson (1996) suggested that the relationship between the referent(s) and the symbols are one in which the referent is encoded in the symbol. Spradley (1980) labelled the three components as the *cover term, included terms* and the *semantic relationship.* The cover term is the name of the *domain* or linguistic symbols that represent core categories or *organising schemes* embedded in the text (Tesch, 1990). The included terms are used to describe the referent objects where the relationship between the cover terms and included terms is called the semantic relationship. The included terms used in this research are adopted from the case summaries developed prior to domain analysis. An example of the domain analysis worksheet is outlined below:

Table 3-6. Example of a Domain Analysis Worksheet

Included Terms	Semantic Relationship	Domain
Intranet	*is a kind of* is a part of is a place in is a way to is used for is a reason for is a stage of is a result of is a cause of is a place for is a characteristic of	*EC Application*
Provide enhanced customer service	*is a reason for*	*EC Application*
Reduced communication costs	*is a characteristic of*	*EC Application*

To extend the domain analysis across all case studies a consolidated domain worksheet is constructed. The domain analysis aggregate worksheet reflects the essence of domain analysis across multiple cases. The construction of the domain aggregate worksheets related the core objectives (Section 1.4.1) of the research to the data analysis to form structured documents for interpretation. In this study there exists five domain analysis aggregate worksheets, which are closely aligned to each research objective.

3.4.5.2 Combining the Two Approaches to the Data Analysis

The strengths of applying a combined approach using a grounded theory methodology and the domain analysis technique enabled the researcher to apply a methodology that could initially identify the core concepts and categories and

then provide a process to distinguish and examine the underlying inter-relationships between the categories or domains.

The coding practices inherent in the grounded theory provide a systematic procedure to distil the underlying core codes and themes embedded in the data. The domain analysis compliments grounded theory by defining data analysis techniques explicitly used to explore key characteristics and inter-relationships intrinsic to the emergent constructs.

The results of the coding process and domain analysis revealed numerous patterns amongst the emergent concepts and themes. The interrelationships that exist in the data sets are explored in greater detail in Chapter 5 where the links and relationships can are further refined, interpreted and conceptualised as heuristic devices.

3.5 Discussion and Interpretation

This section outlines the approach in chapter 6 taken to discuss and interpret the data analysed using the methods discussed above. The combined approach to data analysis utilising grounded theory and domain analysis provided the researcher with a method to extract rich, detailed meaning about the emergent concepts, themes and interrelationships.

The domain analysis aggregate worksheets (aggregate worksheets) provided a mechanism to view and interpret patterns that exist among the emergent concepts and inter-relationships within and between cases. The aggregate worksheets reflect a collection of individual domain worksheets from each case relating to a specific research theme. Relating the development of the aggregate worksheets with key objectives of the research enabled a way to filter the large volume of semantic meanings and relationships across all cases. The results of the domain analysis reveal five domain analysis aggregate worksheets that are used for the interpretation of the data.

- The first aggregate worksheet reflects the data analysis of the first research theme: *Identify why Australian SMEs are using e-commerce,*
- The second aggregate worksheet reflects the data analysis of the second research theme: *Determine how Australian SMEs are using e-commerce,*
- The third aggregate worksheet reflects the data analysis of the third research theme: *Investigate the impact of e-commerce on the organisation,*
- The fourth aggregate worksheet reflects the data analysis of the fourth research theme: *Discover what factors contribute to the utilisation of e-commerce,*
- The fifth aggregate worksheet reflects the data analysis of the fifth research theme: *Detect possible problems associated with using e-commerce.*

The interpretation of the patterns within and across each aggregate worksheet provides an empirically grounded position to develop the four phase model. The

development of the four phase model evolved from the development of three earlier models based on the interpretation of the data:

- *A Four Phase Model of E-commerce Utilisation*
- *Four Phase Model of E-commerce Business Transformation*
- *and Four Forces Model*

Initially *a four phase model of e-commerce utilisation* is developed drawing on the aggregate worksheets constructed for the first two research themes. Combining the analysis found in the third aggregate worksheet a *four phase model of e-commerce business transformation* was established signifying a relationship between the degree of organisation transformation and the potential to derive benefit from e-commerce. The analysis of factors influencing the ability to conduct e-commerce was highlighted in the development of the fourth and fifth aggregate worksheets, consequently a *four forces model* distinguishing the relative influence of internal and external factors on a SMEs ability to conduct e-commerce related business transformation. A final *four phase model of e-commerce of e-commerce utilisation and business transformation* was developed acknowledging all aspects of the data analysis. This model is defined as the Four Phase Model.

A final step in this study is to compare and contrast the research with emergent theory. The development of the four phase models of e-commerce utilisation are discussed in relation to the emergent IS literature subsequent to data collection. A review of the e-commerce literature and models relating to SMEs categorises three key areas of research interest. Firstly, the issues surrounding the adoption of e-commerce by SMEs still receives research attention however the focus of the adoption literature is directed at the regional, rural area and industry sector levels. Secondly, investigations of factors associated with e-commerce adoption and utilisation of e-commerce continue to gain research appeal. Thirdly, models of e-commerce maturity for large and smaller organisation are starting to surface in the IS literature. These models of e-commerce maturity among SMEs are compared and contrasted in relation to the models developed in this thesis.

3.6 Reflections

This chapter outlines the philosophical position adopted by the research. A subjective ontology utilising an interpretative epistemology was deemed the most appropriate for the exploratory nature of the research.

The application of a qualitative multiple case study strategy using thirty-four unique businesses was employed to acquire a rich data source from a broad range of SMEs located in two independent states of Australia. The use of multiple case studies enabled a rich insight into the participant's experiences, views and meanings associated to the use of e-commerce. The multiple case study strategy provided an opportunity to explore the relationships within and across various SMEs.

This chapter has discussed the research design and methods used to collect the data from multiple cases. A series of interviews were conducted with owners/ senior managers from SMEs using a semi-structure interview frame. The question frame was designed to gather participant's opinions, experiences and meanings

about the way they used e-commerce within their businesses, the impacts and problems associated with the use of e-commerce and background information about their business.

A combined method of data analysis involving high-level grounded theory and domain analysis is presented in this chapter leveraging the relative strengths of both methods. Initially a high-level grounded theory approach is applied to individual cases to reveal the conceptual complexity in the data and reduce the large volume of data. Domain analysis is utilised to explore in greater detail the emergent constructs and relationships within and across multiple cases by examining the semantic relationships captured in the domain analysis aggregate worksheets.

The last section of this chapter discusses the process used to interpret and discuss the research. The interpretation of the research and the study's findings is found in Chapter 6. The next chapter presents the first part of the data analysis of the thirty-four cases using a high-level grounded theory approach. The coding procedure associated with grounded theory is applied to the data in Chapter 4. Three specific cases a micro, small and medium enterprise is analysed in-depth to illustrate the combined approach to data analysis using high-level grounded theory and domain analysis methodologies.

4. DATA ANALYSIS PART 1

4.0 Introduction

This chapter provides details of the high-level grounded theory approach, which is used initially as part of the qualitative data analysis.

- The first section of this chapter presents a justification for using the high-level grounded theory technique to analyse the data. The coding procedures used in grounded theory analysis transforms the data to reveal underlying concepts and themes embedded within the data.
- The second section utilises three case examples to illustrate the open, axial, and selective coding practices deployed to derive codes reflecting the attitudes, experiences and meanings concerning the utilisation of e-commerce. These codes are mapped back to the research themes to associate the emergent data dimensions, links and meanings with the objectives of the research.
- In the third section the codes generated from initial coding procedures of individual cases are combined for a preliminary review the emergent themes and relationships found in the utilisation of e-commerce among SMEs. The combination of open, axial and selective codes across all cases revealed 78 open codes, 54 axial codes and 24 selective codes.
- The forth section of this chapter presents a summary reflection of the first stage of qualitative data analysis applied to the data.

4.1 Part A of Data Analysis using High Level Grounded Theory

The first level of data analysis draws upon the principles of the grounded theory coding practices initially developed by Glaser and Strauss (1967). Central to their methodology are three stages of coding, open coding, axial coding and selective coding. Their approach involved transforming the data to extract the underlying relationships and themes that are not merely apparent on the surface. In subsequent research Strauss (1987) proposed an enhanced coding philosophy that looked deeper into the data for elements of meaning not readily apparent. He expanded on the initial open coding phase to include the identification of categories to create broader conceptual frameworks. Strauss (1987) proposed that the coding criteria aimed to look beyond the codes, which condense and categorise the data but also look for links with other phenomena and dimensions. Typically the process of axial coding aims to search for and recognise these possible associations and other dimensions relating to other phenomena (Coffey & Atkinson, 1996).

This chapter illustrates the analysis procedures used to examine the data. The data was initially explored using a high-level grounded theory approach to provide a preliminary analysis of emergent codes and apparent phenomena. A more detailed analysis of these themes across the entire thirty-four case studies is conducted using the domain analysis techniques presented in Chapter 5. The next section discusses the preliminary analysis of the data using of open, axial and selective codes (See Section 3.4.3).

4.2 Open, Axial and Selective Coding Techniques

This section outlines the coding methodology used in the preliminary data analysis. To exemplify the coding practices used in this research, three representative case examples are explored in detail illustrating the open, axial and selective coding procedures employed across all thirty-four cases (See Section 3.4.2). Topics identified by the coding procedures are mapped to emergent themes that relate to the research questions initially posed. The emergent codes found in the first level of data analysis are further examined to determine their relationship with the inherent themes. The examination of the themes is subsequently explored using the domain analysis techniques outlined in the second level data analysis.

Relating the core codes back to the research objectives enables the researcher to map the emergent topics to possible theme areas. The core codes were related back to the initial research objectives and revealed five themes embedded in the data. These are listed below:

- Why is e-commerce used by the SME?
- How is e-commerce used by the SME?
- The impact of e-commerce on the organisation
- Factors that contribute to the utilisation of e-commerce.
- Factors that presented problems for e-commerce utilisation.

The relationship between the core codes and associated codes is presented for each of the case examples following the discussion of the high level coding schemas. Given the high level nature of the coding procedure the terms core code and associated code are used. The selective and axial codes are referred to as core and associated codes respectively to highlight the use of the high level coding schema during the mapping of codes to research themes.

4.2.1 Analysis of Micro Business Case Study (Case Study X)

Case X represents a micro business actively utilising e-commerce as an essential component of their business. This is a unique business with few competitors. The business provides teachers with worksheets used in the classroom. The Internet has enabled this business to establish a new global venture that provides teachers with the ability to download a variety of worksheets as required. Registered users can obtain these worksheets for a fraction of the cost compared to the paper-based alternative.

The web has provided a means for this business to promote their product globally in a cost-effective manner. Daily input from the owners is not essential. The business is run as a virtual business venture and requires little effort from the owners to keep the business functioning. The virtual business model requires minimal resources to run and the on-going running costs are very low. The e-commerce application provides a product that is cost effective to produce and sell, and is accessible and available to the global market. The application facilitates the process of teacher registration, product ordering and delivery. The current application requires little maintenance and is fully automated. The business continues to attract customers both nationally and overseas.

Case Study X: Open Codes

The transcript from the interview was initially coded at a paragraph level into topics of discussion. The first series of coding in Case X revealed 24 open codes. These codes are presented in the table below.

Table 4-1. Case Study X: Open Codes

Open Codes	Topic
Business Background	T1, T17
EC Strategy	T2, T6, T8, T28
EC Benefit	T3
Marketing	T26
EC Driver	T4, T12
EC Application	T5, T7
Strategic Alliances	T9, T18
Cost Benefit	T10
Internet	T11
Management	T13
Web Development	T14
Web Site	T15
Electronic Payment Sys	T16, T29
Product	T19, T20
EC Problems	T21, T25, T33
EC Clients	T22
ISP Problems	T33
Government	T33
Competitive Advantage	T23
Competition	T24
Costs	T27
Security	T30
Future	T31
Customer Service	T32

Case Study X: Selective and Axial Codes

The data set was coded a second and third time to distinguish the axial codes apparent in the data set relating to the set of core selective codes. The review of the data set highlighted 13 core codes (selective codes) and 11 associated codes (axial codes) these codes are outlined in the table below:

Table 4-2. Case Study X: Selective and Axial Codes

Selective Codes	Axial Codes	Topic
Business Background		T1, T17
EC Strategy	Competitive Advantage	T2, T6, T8, T28, T23
	Customer Service	T32
	Cost Benefit	T10
EC Benefit		T3
EC Application	Electronic Payment Systems	T5, T7, T16, T29
	Costs	T27
Strategic Alliances		T9, T18
EC Driver		T4, T12
Internet	Marketing	T11, T26
Management		T13
Web Site	Web Development	T15, T14
Product		T19, T20
EC Problems	Security	T21, T25, T30
	Government	T33
	ISP Problems	T33
EC Client		T22
Industry	Competition	T24
Future		T31

Mapping of Codes associated to Themes for Case 'X'

The next step in the data analysis required the mapping of emergent codes and topics to the themes related to the research objectives outlined in Chapter 1 (See Section 1.2.1). Miles and Huberman (1994) suggest the process of mapping the topics identified in the transcripts to the underlying themes provide an effective method for repackaging and aggregating the data. Although Miles and Huberman (1994) advocate a positivist stance, it is an important part of qualitative data analysis to map the topics to the themes to consolidate the conceptual complexity of the data and focus the emergent codes and topics with the underlying objectives of the study. This step is one part of the data reduction process associated with qualitative analysis and is useful to gather the emergent concepts from the data into coherent data sets.

The process of collating the topics to associated themes provides two analytic purposes. Initially it permits a meta-analysis of the topics and secondly the use of themes can be used for cross comparison of data sets across multiple cases and within each case (Urquhart, 1999).

The following sections relate the core codes and associated codes derived from the selective and axial codes with each theme associated to the initial research objectives. A detailed discussion of the relationships between the coding categories is presented for each theme linked to case study 'X'.

Case X: Theme 1. (Why is e-commerce used by the SMEs?)

The results of the coding procedures for Case X suggest that four core codes relate to this particular research objective. These include *EC Driver*, *EC Benefit*, *EC Strategy* and *Management*. Other codes associated to the core codes include: *Competitive Advantage*, *Customer Service* and *Cost Benefit*.

Table 4-3. Case Study X: Theme 1 Codes

Core Codes	Associated Codes
EC Driver	Competitive Advantage
EC Benefit	Customer Service
EC Strategy	Cost Benefit
Management	

Case X developed an e-commerce application to market their product on the Internet. The owners were the key drivers of this e-commerce enterprise. Members of management are technologically informed and have a history in electronic publishing. They identified the Internet as an opportunity to retail the products with minimal resources.

> My partner has been publishing books, but he realised using the electronic format is better than doing it traditionally. (Case X, T13)

There was a competitive advantage in establishing the business on-line quickly. By being among the first-to-market the business could discourage potential competitors from entering the on-line market.

> I think we have a strategic advantage. As I said other people have started to put work sheets on the Internet. The sooner we establish ourselves the better. (Case X, T23)

The business already secured an advantage by having an existing database of electronic work sheets. The format in which the product is stored is also conducive to retailing on-line.

> Because he is publishing the work sheets in electronic format it really is a simple means of converting them into "pdf". Because that is how it is presented on the Internet. (Cases X, T7)

A new entity was established to retail their product on-line.

> But when we realised the potential for what we are doing we decided not to make it a branch of ..... Publications but to separate it because. It's not merely another way to selling ..... publications. (Case X, T8)

The strategic decision to use the Internet as a transaction platform provides many advantages such as low production cost, product customisation, accessibility, convenience and a competitive price.

> So there's no quality penalty but there is an enormous convenience and price and access. Then we put together the concept. (Case X, T5)

This e-commerce application is unique in the way customers are given credit when they register. A customer account is created automatically and is managed by the application.

> We give them credit. We send them an invoice latter. When they open an account for $20. When they open the account they get 10 work sheets free and when they spend twenty dollars we send them an invoice. Now they may not spent $20 for two years or they might spend it in a month. The micro payment system keeps track of credits and so forth.

The electronic delivery and temporary storage of products provides another convenience for the on-line customers. The advantage of using the Internet to facilitate this business venture provides a strategic incentive to utilise e-commerce.

Case X: Theme 2. (How is e-commerce used by the organisation?)
Analysis of Case X codes applicable to the second research objective "*How is e-commerce used by the organisation?*" suggest that 5 fundamental codes and 4 associated codes are related to the second research objective. The 5 core codes include *EC Application, Internet, Strategic Alliances, EC Benefit* and *Web Site.* Other codes associated to the core codes include; *Electronic Payment Systems, Costs, Web Development* and *Marketing.*

Table 4-4. Case Study X: Theme 2 Codes

Core Codes	Associated Codes
EC Application	Electronic Payment Systems
Internet	Costs
Strategic Alliances	Web Development
EC Benefit	Marketing
Web Site	

The owners of Case X were fortunate to have their product already in a format that was conducive to online transactions. The core imperative to this business was to develop an e-commerce application that would display their product range with an appropriate user interface and provide the account management, order, deliver and storage functions required for the transaction side of the business.

> We can dial in and make any necessary changes. We have a micro payment system. In addition to that we have a management system where we manage the accounts. And collate the accounts. (Case X, T15)

Establishing the new business venture based on an e-commerce platform provides benefits to the business and customers. The business venture is self-supporting and requires little input from the owners to maintain the system. The design of the system enables customers to help themselves. Customers are provided with a product search engine, facilities to download products and the ability to manage their accounts. The business is open 24 hours a day, 7 days a week. It is hoped that existing customers will promote the products through word of mouth.

The product range is stored electronically on databases located locally and in the United Kingdom. The web site provides a central location for customers to browse the products, maintain their accounts and correspond with the owners of the business. No strategic alliances have been formally created although an agent for the product resides in the United Kingdom (UK). A second web site located in the UK mirrors the Australian databases but also contains products specific to the region. E-commerce is used to manage that overseas site and maintain communication between the Australian owners and the UK agent.

The development of the e-commerce system was completed in-house with the aid of a close friend of the management. This has drastically reduced the financial

burden of employing external web developers to develop the e-commerce application.

Case X: Theme 3. (The impact of EC on the organisation)
Four core codes and two associated codes are deemed to relate to the third research objective *"Organisational changes attributed to EC"*. The core codes include *EC Application, Strategic Alliances, Management* and *Product* with associated codes being *Costs* and *Electronic Payment Systems.*

Table 4-5. Case Study X: Theme 3 Codes

Core Codes	Associated Codes
EC Application	Costs
Strategic Alliances	Electronic Payment Systems
Management	
Product	

Case X represents a new start-up business that emerged from an existing enterprise involved with traditional publishing. While no organisational changes have been made a new information systems have been developed utilising e-commerce technologies. Fortunately for CaseX' the product already existed in electronic format and required only minor manipulation to transform the product into an Internet commodity.

> Because he is publishing the work-sheets in electronic format it really is a simple means of converting them into 'pdf' (Case X, T7)

The biggest dilemma faced when establishing the business has been developing the e-commerce application.

> The major problem would have been writing the software and getting it right. Because it is quite complex (Case X, T33)

Fortunately for the business a family friend of the owners was able to provide the programming skills to develop the e-commerce system.

> Oh yes, if you take the time that has gone into it. I say it would have cost $200,000 in time and programming costs if we paid the programmer proper money. But we haven't. He was going out with Tim's daughter. Tim had to give him his daughter but we paid him but not what we would pay a proper programmer. Although he is a very good programmer, professionally (Case X, T27)

If a professional software house were to develop the application, the costs to establish this type of business would be significant. The owners of Case X were fortunate enough to already own the product database and have access to the expertise required to develop the e-commerce system for minimal costs. As the e-commerce system is installed and operating correctly the owners of this business can sit back and let the business grow in it's own time.

> I would like to be driving that business not doing what I'm currently doing. The time for the business to grow maybe a lot longer then in other times. I'm not sure. (Case X, T31)

No formal strategic alliances are in place. The business does however maintain relationships with a publisher in Britain. At the time of the interview, the owners were not keen to market any other complementary products but were open to assessing other content from potential providers.

> We have one other on board at the moment, a British publisher. And we have just started putting his stuff up but we have slowed the whole thing down at this stage. But there are many other people who what to be included. But its not happening. So the costs of running what we are already doing are quite high and to host more material at this stage wouldn't be beneficial because no one is using it at this stage. (Case X, T9)

The chance for virtual collaboration with other individuals offering complementary products or content exists. If these collaborative relationships are pursued then the some changes regarding business operations will be required.

Case X: Theme 4. (Factors that contribute to the utilisation of EC)
Seven core codes with three associated sub-codes are considered to be relevant to the forth research objective "*Factors that contribute to the utilisation of EC* ". The factors considered to influence business X's utilisation of e-commerce include *Business Background, Management, Industry, Product, Web Site, Strategic Alliances* and the *Internet.* The influence from *Competition, Web Development,* and *Marketing* are also considered to potentially impact on the utilisation of e-commerce.

Table 4-6. Case Study X: Theme 4 Codes

Core Codes	Associated Codes
Business Background	Competition
Management	Web Development
Industry	Marketing
Product	
Web Site	
Strategic Alliances	
Internet	

The management from Case X conceived the business idea from earlier experience with Internet technology. Members of management are technology aware and could identify a business opportunity. The business was established to strategically utilise e-commerce by using Internet technologies to provide a fully automated business operation that required little intervention from its owners. Users are able to manage product selection and perform order and payment transactions unassisted. The lack of management involvement makes this e-commerce system highly attractive for the owners. No apparent competition exists in the marketplace and the opportunity to secure a market share on the Internet was imperative. Management expects the business to grow through 'word of mouth' marketing.

The product is stored and transferable in digital format and is thus naturally conducive to being traded in an on-line environment. The management has hands on experienced with technology and web-based products. The expertise with technology and a background in the education sector enables the owners to capitalise on a business naturally designed for e-commerce.

A family friend developed the business's web site and e-commerce application at a substantially reduced rate. If market rates were paid for the development of the software the estimated programming costs would be a significant factor determining the viability of the business venture.

The business considers itself to be a pioneer with little or no competition visible in the online market place (Case X, T24). No strategic alliances have been sought although other content providers wishing to provide value-added products on the business's web site have approached the business (Case X, T9).

Case X: Theme 5. (Factors that presented problems for EC utilisation)
Analysis of the data suggests that problems associated with the use of e-commerce are attributed to four core codes the; *Internet, EC Clients, Government* and *EC Problems.*

Table 4-7. Case Study X: Theme 5 Codes

Core Codes	Associated Codes
Internet	Security
EC Clients	ISP Problems
Government	Marketing
EC Problems	

The development of the e-commerce system presented few problems but the most notable was the level of service provided by the Internet service provider (ISP). The owners experienced problems with the instability of services provided by the ISP. This issue was significant enough to warrant the finding an alternative ISP in North America to host the site.

> The major problem would have been writing the software and getting it right. Because it is quite complex. We have to have software that can load up the materials and the other problem is the ISP keep moving the goal posts. That's a problem ... (Case X, T33)

> They keep moving the goal posts. They are growing so fast. I'm even thinking at the moment of locating the web site in America, on a web server there where we are likely to get more stability. (Case X, T33)

The owners are also concerned about the potential government regulation of material hosted by Australian ISPs and taxation requirements for Australian customers. The concern is that this may slow up access to the site.

> ... because there is also the problem of GST, to see how that might affect it. The other problem is that problem of filtering of material. That will slow it up too much. (Case X, T33)

The management acknowledges the slow uptake of the Internet and general Internet accessibility for customers as potential problem areas. The general lack of computer literacy by the public also concerns the business owners.

> I believe that there is a lot of hype and talk about it. I believe the Americans are right into it but I think they are ahead of the game. I don't think Australia is that far behind but I don't think it will take off for a while because there are a number of things that are stopping it. Its not fast

> enough to start with. The second thing is there aren't the people around with the computer knowledge. (Case X, T11)

The business owners concede that their particular target audience does not have convenient access to computers and the Internet and are generally too busy to look on the Internet for resources and this is problematic.

> The problem is the customers... Firstly there's a huge range of teachers who are my age and not into computers (Case X, T21)....The problem is that thy haven't got time to use them. (Case X, T22)

The final factor proving problematic for Case X is marketing their product. The business is resorting to 'word of mouth' advertising, as the costs associated with the intensive product marketing are prohibitive.

> The cost of getting impact on an advertisement now is enormous (Case X, T25)

Using direct feedback from customers, management try to develop a range of customised marketing strategies tailored to each customer requirements.

In the next section a first-level data analysis is discussed with reference to another case example, Case E.

4.2.2 Analysis of Small Business Case Study (Case Study E)

Case E is a supplier of a range of corporate work wear to major companies located in Tasmania. Traditionally the orders for products have been received via telephone, fax or face-to-face. The business consistently had to answer queries from customers on a daily basis regarding order details, product availability and delivery dates. This is a time consuming task searching through manual invoices and other paperwork. What was required was an electronic system to efficiently manage these queries. Case E also wanted the system to provide more value for the customer other than basic inventory control. In conjunction with local consultants, an e-commerce system was developed to handle customer enquires but also to provide a tool for corporate customers to manage their budgetary requirements. In consultation with clients, the corporate clients indicated that this would be a valuable service if it could be incorporated into the design and development of the e-commerce application.

The e-commerce system improves the level of customer service by providing details of orders, products in a convenient and accessible manner. The extra facility to monitor and manage budgetary requirements instils increase customer loyalty for the Case E. Internal resources previously required to handle customer enquires can be allocated elsewhere in the business. The application of e-commerce aims to provides benefits to the business and to the clients.

Case Study E: Open Codes

The transcript from the interview was initially coded at a paragraph level into topics of discussion. The first-level data analysis required examining the data set for a set of open codes. The procedure revealed twenty open codes for Case E and is outlined in the table below.

Table 4-8. Case Study E: Open Codes

Open Codes	Topic
Business Background	T1, T14
EC Strategy	T2, T4, T8, T11, T19, T35, T37, T39
EC Clients	T3, T7, T28, T30
EC Application	T5, T12, T16, T20, T22, T25
EC Driver	T6
Competitive Advantage	T9
Competition	T10, T40
IT Infrastructure	T13, T15
Training	T17
Management	T18
Web Site	T21
EC Support	T23
Supply Chain	T24
Communications	T26
Customer Service	T27
Electronic Payment Sys	T29
Product	T31
EC Problems	T32, T33, T36
Marketing	T34
Future	T38

Case Study E: Selective and Axial Codes

A series of further examinations of the data set was performed to seek possible relationships between the codes and to distinguish the core codes that are significant to this research. The procedure found the initial open codes could be expanded into fifteen selective codes and a further six axial codes.

Table 4-9. Case Study E: Selective and Axial Codes

Selective Codes	Axial Codes	Topic
Business Background		T1, T14
EC Strategy	Marketing	T2, T4, T8, T11, T19, T35, T37, T34, T39
	Competitive Advantage	T9
	Customer Service	T27
EC Clients		T3, T7, T28, T30
EC Application	Electronic Payment Systems	T5, T12, T16, T20, T22, T25, T29
EC Driver		T6
Industry	Competition	T10, T40
IT Infrastructure		T13, T15
Management	Training	T18, T17
Web Site		T21
EC Support		T23
Supply Chain		T24
Communications		T26
Product		T31
EC Problems		T32, T33, T36
Future		T38

Mapping of Topics associated to Themes for Case 'E'

The next step in the data analysis required the mapping of emergent codes and topics to the themes. These themes relate to the research objectives outlined in Section 1.4. The process of mapping the topics identified in the transcripts to the underlying themes provides an effective method for repackaging and aggregating the data (Miles & Huberman 1994:92). This step is one part of the data reduction process associated with qualitative analysis and is useful to gather the emergent concepts from the data into coherent data sets.

The process of collating the topics to associated themes provides two analytic purposes. Initially it permits a meta analysis of the topics and secondly the use of themes can be used for cross comparison of data sets across multiple cases and within each case (Urquhart, 1999).

The following sections relate the core codes derived from the selective and axial codes with each theme associated to the initial research objectives. A detailed discussion of the relationships between the coding codes is presented for each theme linked to case study 'E'.

Case E: Theme 1. (Why is e-commerce used by the SME)

Developing an e-commerce strategy that could provide benefits for both the business and the customer, initially proved difficult for Case E. The owner identified the potential opportunities from using e-commerce as a way for improving relationships between the business and its customers. Discussions with e-commerce consultants and developers resulted in a draft for a strategic plan to use e-commerce to improve the level of customer service and rapport with the major clients. A review of the codes from the transcripts suggests three core codes and three associated codes are related to Theme 3 in Case E. These codes are presented in Table 4-10.

Table 4-10. Case Study E: Theme 1 Codes

Core Codes	Associated Codes
EC Driver	Marketing
EC Clients	Competitive Advantage
EC Strategy	Customer Service

In this case, the principal reason for using e-commerce is to provide an alternative to the manual order entry system and improve the procedure to handle customer enquires.

> And we've been doing it all manually, we get an order from phone or fax or when a guy comes in. It goes into the system then we have queries from some of our customers saying "Do you know if Bill Smith has been issued his overalls?" and we have to say crickey, we have to spend up to half an hour going manually through invoices, to find an invoice with Aurora Energy with Bill Smith for a pair of trousers (Case E, T2)

The new e-commerce system aims to improve the speed of answering customer inquiries and providing a system where the customers can address their information requirements on-line at their convenience. This saves time for both the customers and the business.

The desired effect from adopting e-commerce was to provide benefits for both the business and customers. The e-commerce application is aimed at providing customers with a "one-stop shop".

> We said right um what can we provide the customers to give virtually a one-stop shop now. What about those guys who find it difficult in coming in or they are not happy to fax an order um they've got computers on their desks. What can we provide them, solution bang, that's where we got the interest, that's why we forged ahead with it, to provide virtually a value added service to our customers. (Case E, T8)

Customers are able to process orders on-line and access individual client reports concerning order status, financial summaries and product information. The aim of the customer information system is to provide privileged customers increased convenience and an extra incentive to continue trading with the business. Preliminary discussions with some major customers prior to implementation revealed positive feedback for the proposed application.

A priority before implementing the project was to ensure that all the major customers had access to the web and were already conversant with computers and the Internet. This ensured that minimal training was required. The system was aimed at major corporate customers of the business.

The e-commerce system was not primarily aimed at increasing sales, but rather at ensuring that the level of customer service was maintained or improved. In-house benefits gained from the system include better resource allocation and a reduction in customer inquires.

> I suppose we want to be totally customer focused, cause if we didn't have customers we wouldn't be here, now because it's such a competitive industry we want to get those customers and we want to keep them, and by working out get more customers. (Case E, T39)

An extra advantage of the system not initially foreseen is the ability for the business to cross-sell to customers other complementary products.

The business trades in a highly competitive environment. A first mover advantage was sought to gain a strategic advantage over existing competition. The strategic use of e-commerce is aimed at securing existing customers and to minimise the market penetration of existing and new competitors.

Case E: Theme 2. (How is e-commerce used by the organisation)

E-commerce is primarily used to improve customer support and incorporates an innovative customer management system, providing a value-added service to increase customer rapport and loyalty. A review of the codes from the transcripts suggest two core codes and five associated codes are related to theme 2 in Case E. These codes are presented in Table 4-11.

Table 4-11. Case Study E: Theme 2 Codes

Core Codes
EC Application
Communications

The e-commerce application is aimed at providing benefits to both the business and existing customers. It allows valued customers to review products, activate orders and review transaction histories. The other advantage for the system is that corporate resource managers will be able to maintain individual budget allocations for each member of staff.

> We want to go back a further step to keep our customer base by providing them with a service they want and that service is basically management for their apparel issues and so we can pool facilities to go back so that they can monitor against budget and monitor against individual issues and stuff like that. (Case E, T2)

Feedback from customers can be recorded by the system and e-mail facilities provide an alternative communication method for customers. The management plans to introduce e-commerce into the business in various stages. The first stage of the system converts on-line orders automatically into faxes via fax routing software at the ISP. These faxes are then passed on to the business. At a later stage when the number of on-line orders increases, the orders will be logged directly into the business's backend information systems.

The e-commerce system has been developed to eventually integrate fully into the existing accounting system. This will minimise the need to re-enter on-line orders and reduce problems of double entry and the potential for human error from manual data entry. The application uses a web interface so that the system is available to any potential customer on the Internet. An Internet based system increases accessibility and standardises the order entry system meaning that proprietary software does not need to be installed on every customer's computers.

Case E: Theme 3. (The impact of EC on the organisation)

The implementation of the e-commerce system has changed some of the traditional business processes in the business. The system has removed much of the manual labour involving order entry and customer relationship duties. The ability for a customer to directly order, and fulfil, most of their customer enquires on-line releases some business resources that can be more gainfully employed in other business operations.

A review of the codes from the transcripts suggests four core codes are related to Theme 3 in Case E. These codes are presented in Table 4-12.

Table 4-12. Case Study E: Theme 3 Codes

Core Codes
IT Infrastructure
Management
EC Application
Product

The implementation plan is to incorporate various stages of e-commerce integration over time. A totally integrated solution is desired but will take place over a series of stages depending on consumer demand.

> We are using the Accpac accounting systems although we haven't yet gone the whole hog of actually automating the integration back into that, in the functional specifications stage we looked at how we could implement the integration to the system and we are basically ready to do that move on the basis of volume I suppose, if the order volume is there. (Case E, T12)

A staged approach has been undertaken to minimise the impact on business processes and reduce the need to outlay initially further financial resources.

The IT infrastructure requires minor changes as the business had previously changed over from a centralised mini-computer network to a distributed network of PCs. No major capital investment or changes to existing IT infrastructure were required.

The implementation of the e-commerce system caused little impact on staff and management. This can be attributed to a high level of motivation by top management and staff members at head office who are enthusiastic and wish to see the system succeed.

> Plus all of us are willing to learn um. I've got a salesman who use to be a storeman and now he's screaming out why he hasn't got a terminal so the next thing we've got to look at is providing laptops. (Case E,T18)

In this business management shares the support and maintenance of the existing information technology systems with external ISP/IT consultants. In the case of the new e-commerce system the support policy will remain unchanged.

Case E: Theme 4. (Factors that contribute to the utilisation of EC)

The development of a strategic e-commerce plan provides a clear pathway for how e-commerce can be used and implemented within the business. This business intends to introduce e-commerce in set stages as dictated by demand. In this way the introduction of e-commerce is controlled and cost effective. A review of the codes from the transcripts suggests nine core codes and five associated codes are related to theme 4 in Case E. These codes are presented in Table 4-13.

Table 4-13. Case Study E: Theme 4 Codes

Core Codes	Associated Codes
Business Background	Marketing
EC Strategy	Competitive Advantage
Product	Customer Service
Management	Training
EC Clients	Competition
Web Site	
EC Support	
Industry	
Supply Chain	

The management is prepared to take an active role in the development and support of the e-commerce system. This is an important factor in the ongoing viability and success of the use of e-commerce in the business.

The level of competition in this industry is high at both the National and State level. The major threat potentially is that the suppliers to the business will try to compete directly with it. It is of paramount importance to management that major customers are satisfied with arrangements and intend to continue business dealings with the business.

> The apparel industry is very very competitive and we've got to have the edge by providing customers that little bit extra for no extra cost. (Case E, T6)

Currently competitors are not providing any e-commerce services. It is important to management that a competitive advantage is gained and maintained by being first to acquire an on-line presence.

> And yeah, that's basically what I want to do is basically be first in, there's no use if your competitors have the same idea and lets face it they're not dumb dumbs, they're in it for a bob too. If they develop their own management system and go on the net as well, we'll loose advantage, because ...(Case E, T40)

Top management is the main driver for the e-commerce strategy. He is motivated and enthusiastic about the use of e-commerce. Management take a hands-on role with IT support and call on external help when required.

The role of the ISP and external IT consultants helped this business to plan, develop, implement and support this e-commerce application. Their significant input was critical to the success of the e-commerce system.

The fact that the corporate customers are computer literate and have the facilities to access the Internet provided further motivation for the use e-commerce. Initial comments from key customers about the business's plan to use e-commerce proved encouraging.

> We're fortunate in that their large, our customer base is largely web literate have terminals down at the employee level, hydro and forestry etc penetration is good and the employee I don't think it's going to take much education for them to move to the web for their uniform ordering. (Case E, T28)

Investigating the use of e-commerce for other parts of the business along the supply chain had not been considered at time of the interview. The existing supply chain relationships do not support any e-commerce activities but it is a consideration for the future.

Case E: Theme 5. (Factors that presented problems for EC utilisation)
Management noted no major problems developing and implementing the e-commerce system. A few technical issues occurred when the development team was integrating the e-commerce application with backend systems.

> It was certainly not an open system. It was one of the biggest challenges. One of the early hurdles was getting around it. It was lucky that we had done a fair bit of work in that area before, actually opening up accounting systems John has and I have, so we knew where to look. (Case E, T33)

The synergy between the ISP, IT consultant and management may have overcome any potential problems. The historical working relationship between the IT consultant and top management would inevitably increase the chances of success for this e-commerce project.

4.2.3 Analysis of Medium Business Case Study (Case Study R)

Case R provides an example of a medium sized company utilising e-commerce. The business provides a suite of products mainly on assisting businesses avoid bad debt. Credit reporting of individual businesses and the production of a credit bulletin are central tasks for the business. The business also provides debt recovery services to complement the credit reporting functions. The majority of clients are located statewide although there are a few customers located on mainland Australia. The business has branch offices in 4 major cites. The use of e-commerce is customer centric. E-commerce is used primarily as a strategic tool to improve organisational work flow and customer service by providing an on-line alternative to the lodgement of credit information and debt recovery details. A substantial investment in IT and e-commerce technologies were made to design, develop and host the e-commerce system.

The business has an in-house team of IT specialists that transformed existing information systems to cater for the e-commerce activities. External consultants were involved to design and develop the business's web site and interface into the backend systems. The e-commerce interface has gained wide appeal from customers. In the first twelve months of operation with over 50,000 e-mails have passed through the e-mail server. The design of the e-commerce system was conducted with input from several valued customers. The implementation of e-commerce has provided an innovative alternative for clients transacting with the business, which offers a convenient service providing information that is dynamically updated and live. The transformation within the business has been transparent but the benefits derived from e-commerce have been significant.

Case Study R: Open Codes

After the interview was conducted a transcript of the conversation was created. After a participant from CaseR' validated the content of the transcript, the transcript was prepared for open coding. The open coding process involved initially coding at the paragraph level. This was initiated in order to acquire an appraisal of the data set. The open coding of case study 'R' produced twenty-three core codes. These are listed in Table 4-14.

Table 4-14. Case Study R: Open Codes

Open Codes	Topic
Business Background	T1,T3,T6, T7,T28, T24
EC Clients	T4,T10,T25,T30, T39
Employee Information	T2
Competition	T5, T38, T40
Competitive Advantage	T40a
EC Benefit	T8, T19
EC Strategy	T9, T17, T35, T43
Management	T11,T45
EC Driver	T12
EC Application	T13, T36,T15, T20, T22
Future	T14, T48
IT Infrastructure	T16, T27, T46
Organisational Change	T18,T29,T31
Email	T21,T33
Web Site	T37
Supply Chain	T23
EC Support	T26
Internet	T32
Marketing	T34
Cost Benefit	T41
Government	T42
EC Problems	T44
Security	T47

Case Study R: Selective and Axial Codes:
Subsequent inspections of the data were conducted to examine the open codes more closely for any new emergent codes or preliminary relationships between the codes. After a second and third pass through the raw data sixteen selective codes were found with a further eight associated axial codes. These are outlined in the table below.

Table 4-15. Case Study R: Selective and Axial Codes

Selective Codes	Axial Codes	Topic
Business Background	Employee Information	T1,T3, T6, T7,T28, T24, T2
EC Clients		T4,T10,T25,T30, T39
EC Strategy	Cost Benefit	T9, T17, T35, T43, T41, T40a
EC Benefit		T8, T19
EC Application	Organisational Change	T13, T15,T36, T20, T22, T18,T29,T31
Management		T11,T45
EC Driver		T12
Communications	E-mail	T21,T33
Supply Chain		T23
EC Support		T26
Internet	Marketing	T32, T34
Industry	Government	T42
	Competition	T5, T38, T40
IT Infrastructure		T16, T27, T46
EC Problems	Security	T44, T47
Web Site		T37
Future		T14, T48

Mapping of Topics associated to Themes for Case 'R'
The next step in the data analysis required the mapping of emergent codes and topics to the themes. These themes relate to the research objectives outlined in section 1.4. The process of mapping the topics identified in the transcripts to the underlying themes provides an effective method for repackaging and aggregating the data (Miles & Huberman 1994:92). This step is one part of the data reduction process associated with qualitative analysis and is useful to gather the emergent concepts from the data into coherent data sets.

The process of collating the topics to associated themes provides two analytic purposes. Initially it permits a meta analysis of the topics and secondly the use of themes can be used for cross comparison of data sets across multiple cases and within each case (Urquhart, 1999).

The following sections relate the core codes derived from the selective and axial codes with each theme associated to the initial research objectives. A detailed discussion of the relationships between the coding categories is presented for each theme linked to case study 'R'.

Case R: Theme 1. (Why is e-commerce used by the SME)
A review of the codes from the transcripts suggests five core codes and two associated codes are related to Theme 1 in Case R. These codes are presented in Table 4-16.

Table 4-16. Case Study R: Theme 1 Codes

Core Codes	Associated Codes
EC Driver	Cost Benefit
EC Clients	Competitive Advantage
EC Strategy	
Management	
EC Benefit	

The focus of this study is the investigation of how e-commerce is used by the SMEs. The use for e-commerce varies across the businesses. In some cases, e-commerce is used as an electronic brochure while in other cases the use of e-commerce is more advanced and highly integrated.

Case R approached the use of e-commerce with a specific plan to significantly enhance the services provided to existing and new clients. The business provides credit-reporting information and debt collection service to registered clients. The provision of this information is highly suited to an e-commerce environment. Even though a weekly status report is printed out and mailed to clients via the postal service, management recognised that a large proportion of clients had e-mail and Internet access and deemed it an appropriate time to develop an e-commerce service.

Management considers their management style to be innovative. The development and implementation of the e-commerce system was assigned to a member of management to coordinate and oversee the design, development and implementation of the e-commerce system. Other senior managers have no interest in the technology but there was consensus that development of an e-commerce strategy and system was important to remain innovative and competitive. The support and maintenance of the e-commerce system is provided in-house by internal IT staff.

The clients are predominantly based locally within Tasmania. The business recognised that significant proportions of the clients have access to e-mail and the Internet. It was difficult initially to encourage clients to use an alternative reporting system but current statistics indicate that over 1100 users are using the e-commerce system.

The use of e-commerce improves accessibility and flexibility of existing reporting methods. The website provides clients with an alternative to existing paper print outs. The e-commerce applications allow clients to personalise the reports by allowing clients to enter their own comments on each debtor's files. In effect the e-commerce system provides a contact management system providing an interface that is user friendly to the valued clients.

The motivation to incorporate e-commerce functionality originated from senior management. The management collectively agreed that it was an appropriate time to integrate some e-commerce initiatives within the business. One of the mangers had expert knowledge of technology and planned the e-commerce strategy, including the input of other managers.

The business's use of e-commerce maintained a strategic focus throughout the design phase and through to implementation. The decision to incorporate a dynamic website as opposed to a static brochure-ware site was initially intended. Part of the design process was to integrate the e-commerce system directly with existing backend information systems.

> the original motivation was to get a web-site up and running and there wasn't enough product and I couldn't see much point in getting a get a static web-site up so we built a dynamic web-site right from the word go. (Case R, T9)

A major driver to proceed with the e-commerce system was to reduce cost within the operational work processes and, significantly, the realisation that many of the existing clients had access to e-mail and the Internet. In the 18 months prior to the interview the business had noted the increase in Internet connections reported by the media.

The final strategy included consultation with numerous clients to assess the aims and objectives of the e-commerce system, to provide existing clients with an on-line tool that could support existing reporting methods.

> I suppose where we talk to we have a lot of interaction with our clients, there's bureau meetings which focus in particularly market sectors and things like that where we get together with all our clients actually talk about things and all that sort of stuff. (Case R, T43)

No formal cost benefit analysis has been performed but an estimation of cost savings was performed and a range of perceived benefits identified encouraged the development of the e-commerce system.

> Its extremely difficult to do cost benefit, um we factored internal transactions we might do a week and what would be the possible cost savings in terms of staff and things like that and that was. (Case R, T41)

The perceived benefits of using e-commerce were to extend existing services to the clients. The e-commerce system improves accessibility to information and reports. The information is provided in a "clean format" and the information is current and up to date. Immediate credit reporting is possible and the costs of telephone calls have been significantly reduced. Other unexpected benefits include the attraction of more mainland clients that use the on-line service.

Case R: Theme 2. (How is e-commerce used by the organisation)

A review of the codes from the transcripts suggests six core codes and two associated codes are related to theme 2 in Case R. These codes are presented in Table 4-17.

Table 4-17. Case Study R: Theme 2 Codes

Core Codes	Associated Codes
EC Application	E-mail
Communications	Marketing
Internet	
Web Site	
EC Clients	
Supply Chain	

The e-commerce application provides an alternative format to the paper based reporting and can be produced at a reduced cost and with up-to-date information. The clients have the ability to interact directly with the e-commerce system and can update details as they become available. The e-commerce system is linked directly into the legacy system for efficient data updates. Software has been developed to accept a range of data formats for data entry from clients with non-standard file formats. This removes the need to manually enter any information into the information system.

The Internet provides a gateway for clients to interact with the e-commerce system although accessibility to the Internet by staff is limited. Electronic funds transfer is used with the banks and clients can pay for services via EFT. E-mail is used extensively by the business to communicate with clients. Clients that have bulk lodgements use e-mail to attach debt collection lodgements for processing. The business uses a software filter to pass the information into the database. The Internet is used for basic searching activities. The business does not intend to use the Internet as a marketing tool.

Information provided to the business has historically been entered manually into the information system. With the use of e-mail, information providers supply the information as e-mail attachments in electronic format. This increases the speed to content provision and alleviates the inherent problems with manual information entry.

Clients throughout Tasmania and on mainland Australia can have access to the e-commerce system. The e-commerce system provides traditional reporting functions but also provides dynamic interaction with clients so debtor details can remain current. The ability for clients to include comments and make amendments to the database enhances the services provided in the past.

The supply of other credit information from content providers is starting to be accessible electronically, which is a major benefit. In the past much of the information was entered manually which was laborious and potentially erroneous.

> Yes, we're just in the process of setting up electronic file transfers with Corporate Affairs so we'll be transferring. (Case R, T23)

Case R: Theme 3. (The Impact of EC on the organisation)

It is considered that four core codes and one associated code relate to the organisational changes attributed to e-commerce. These are listed in the Table 4-18 below.

Table 4-18. Case Study R: Theme 3 Codes

Core Codes	Associated Codes
IT Infrastructure	Organisational change
Management	
EC Application	
EC Clients	

The introduction of the e-commerce application has changed the organisational business processes. The intention of management is that the introduction of e-commerce will result in minimal changes for internal staff. The introduction of e-commerce has been transparent for internal staff, the fundamental changes to existing business processes and additional business duties have not altered the work activities of the staff.

> It is very much focused on the customer interface. So as far as our core operators are concerned they have no knowledge of the system there's been a couple of small changes, which has actually streamlined out work. (Case R, T31)

However the change for clients dealing with the business has been significant. The clients now have an alternative interface for interactions with the business and an optional method of receiving credit reports and associated information. The major changes have centred on the technological infrastructure of the information system, how information is collated, and how it is reported to the clients and the internal staff. As a consequence of implementing the e-commerce system business processes are more streamlined, cost effective and current.

The technological changes to the business have been immense. The implementation of e-commerce required significant upgrading of hardware and software. The business has updated its legacy database systems to an Oracle standard. The integration of a web-based interface directly to the Oracle database is central to the e-commerce system. Communications networks between regional offices have also been standardised to utilise an Internet based protocol and the business maintains total control over their e-commerce system by hosting the web site internally and employing dedicated IT staff.

Management acknowledged the need to adopt a web based presence and set about formulating a strategy to gain the most from e-commerce even though members of management did not understand or possess an interest in the technology. Management fully supported the use of e-commerce within the business. Members of management were instrumental in designing, developing and implementing the e-commerce system.

The e-commerce system has not significantly altered any of the existing tasks performed by internal staff but has provided clients with alternative, more functional services offered by the business. New business processes have been created as a result of incorporating e-commerce within the business.

A substantial number of clients are now using the on-line interface to access information from the business. This has resulted in significant communication costs reductions. Clients were initially slow at using the newly developed e-commerce system but the growth in users has been notable. Recent statistics indicate around 1100 users presently access the system. This equates to a reduction in resources previously used to address these client needs. The clients have the ability to enter comments about debtors directly via the web interface that reduces the need for organisational staff to update debtor records upon receiving information from clients.

Case R: Theme 4. (Factors contribute to the utilisation of EC)

Numerous factors contributed to the utilisation of e-commerce by business R. The role of management, in-house technical resources and support from valued customers all provide an essential mix of incentives for an e-commerce value proposition. A review of the emergent codes in the transcripts suggest ten core codes and four associated codes related to Theme 4 in case study R.

Table 4-19. Case Study R: Theme 4 Codes

Core Codes	Associated Codes
Business Background	Employee Information
Management	Competition
Supply Chain	Security
EC Problems	Competitive Advantage
EC Clients	
IT Infrastructure	
Industry	
Government	
Internet	
EC Support	

This business primarily deals in information related products. In the past much of the information has been manually entered into the organisational information system and paper reports were printed out and mailed to registered clients. The storage of information and delivery of reports is highly suited to the digital era. Management agreed that the timing to introduce an e-commerce system was indeed appropriate. Factors that contribute to incorporating e-commerce relate to the fact that the business trades in information products. The internal IT team was able to substantially upgrade it's IT infrastructure to cater for e-commerce activities and the business possessed skills within senior management to oversee, develop and implement and support e-commerce changes.

In the past the supply of 'raw' information was provided in paper-based format and had to be manually re-entered. Currently the content providers are starting to provide information in electronic format, which will aid in streamlining content provision for the business. The use of e-mail particularly becomes important for in transferring content from providers and to clients.

The business was fortunate to have in-house expert IT specialists that could develop and alter existing back office systems to incorporate a web-interface. The problems that have arisen were technologically related during the development phase. The in-depth knowledge of existing IT staff reduced the potential number of e-commerce problems. A close working relationship with external web developers ensured a smooth transition for the business. The staff within the business were unaffected by the development and implementation of the e-commerce system.

A substantial number of clients have access to e-mail and the Internet. The management of the business acknowledged that many of the clients', particularly corporate clients, have access to the Internet and would be potentially attracted to using a web interface to access information from the business.

> A lot of our clients now have access to the net and that has grown enormously over the last 18 months probably since we've put our web-site up so it's excellent timing as far as we are concerned (Case R, T35)

A slow uptake of the new interface was initially observed however the business has encountered significant growth in the usage of their e-commerce system.

The IT infrastructure entailed a significant change to incorporate e-commerce functionality. The business was committed to changing its existing IT infrastructure to cope with the introduction of the e-commerce system. The perceived benefits of reducing costs provided the driver to utilise e-commerce. The business used internal IT staff and independent web developers to develop the e-commerce application.

The ability to gain a government grant to help subsidise the implementation of the system has off-set the overall cost of the e-commerce application. The support provided by the government subsidised a portion of the development costs.

Access to the Internet has been limited to specific staff. A trial of open Internet access to all staff resulted in reduced staff productivity and was not considered beneficial to productivity. Limited access to the search engines remains the best use for the Internet internally within the business. The e-commerce support is provided in-house by a dedicated group of IT staff this has reduced the potential problems in designing, implementing and maintaining the e-commerce system.

Within the State the business is considered an industry leader.

> We are the main market leaders in Hobart but that's not to say we don't have competition with the mainland (Case R, T38)

However the threat of competition exists from other companies based in the mainland. Management acknowledges that their range of products and services are superior to competitors.

> I think our website probably provides advantage, even though it's only two core products in there, we provide a broad spectrum of product range through our web-site (Case R, T40)

Security is an ongoing concern for the business. As a consequence the developers customised the software to ensure data integrity and control.

Case R: Theme 5. (Factors that presents problems for EC utilisation)

There were no major problems encountered with the introduction of the e-commerce system. Several technical difficulties occurred during the development phase but have been overcome. The introduction of the e-commerce application received a slow uptake of clients but there has since been an increase in user activity. The slow uptake was attributed to a lack of marketing and motivation by management to market e-commerce.

> Yeah I'd have to say it has been hard to encourage clients, yeah mainly because the marketing methods within our organisation are somewhat antiquated and the CEO, my brother, Peter, he just sees the website as something that he has to do. He doesn't like to make fuss too much with the

actual date and doesn't get excited with the details cause that's my job. (Case R, T11)

4.3 A Consolidated List of Individual Case Codes

So far this chapter has shown an in-depth overview of the coding procedures used to identify core codes and associated sub-codes. In each case study the first review of the data inspects the transcripts for a set of *open codes.* The data is examined a second and third time to reveal emergent core codes and subsequent associated codes. The relationships and dimensions of these codes with the underlying research objectives were mapped and explored in detail to provide a preliminary path for data interpretation. The process of open, axial and selective coding was conducted with each of the thirty-four cases. The codes were amalgamated to provide an overall preliminary data analysis. Combining the open coding process across all cases revealed a set of 78 open codes. The next section discusses these codes.

4.3.1 A Collective List of Open Codes Apparent in the Data

The initial pass of the data revealed a collection of open codes. The open codes reflect key topics discussed during the interview. An initial inspection of the codes found a range of codes addressing all aspects of e-commerce utilisation by SMEs. A review of the codes highlighted a shared similarity amongst some of the codes. The second pass through the data with the specific intention of exploring these potential relationships was conducted in order to determine a set of axial codes. Each interview with case participants uncovered a range of topics linked to the questions posed. Using the question format outlined in Section 3.3.1 the table below identifies the scope of open codes.

Table 4-20. List of all the open codes emergent from all cases

Business Background	EC Knowledge	ISP Services	Orders
Business Expansion	EC Problems	ISP Clients	Organisational Problems
Business Strategy	EC Strategy	ISP Fee Structure	Problems
Clients	EC Success	ISP Problems	Procurement
Communications	EC Support	ISP Industry	Product / Service
Competition	EDI	IT Benefits	Publishing
Competitive Advantage	Electronic Banking	IT Education	Regrets
Cost Benefit	Electronic Publishing	IT Expansion	Return on Invest.
Customer Service	E-mail	IT Infrastructure	Sales
Distributors	Employee Information	IT Investment	Security
EC Adoption	Electronic Payment Sys	IT Skills	SMS
EC Application	Fraud	IT Strategy	Strategic Alliances
EC Barriers	Future	IT Support	Supply Chain
EC Benefits	Government	Market Niche	Target Market
EC Clients	Industry	Management	Transport / Delivery
EC Costs	Information Resources	Management Problems	Virtual Organisation
EC Drivers	Information Transfer	Management Support	Web Site
EC Education	Internet	Market Research	Web Site development
EC Failure	Internet fraud	Marketing	
EC Integration	Intranet	Nature of the customer	

An inspection of the open codes identified various associations between the initial topics. Consequently the data set was examined a second time to investigate the existence of underlying relationships between the topics, producing a revised set of topics.

4.3.2 Identification of Axial Codes (Associated Codes)

The second pass through the data set uncovered several links and associations between a number of the open codes. The initial codes identified in the first pass disclosed a range of topics. The nature of these topics was explored in greater depth during the second pass through the data. Any emergent links and associations between the open codes were noted and the identification of new concepts associated to the initial topics was also recorded.

In order to extract meaning from the codes it was important to determine how the codes relate to the original data. The next level of analysis requires the reconceptualized data to be presented in a format that is easily studied.

Importantly any notable exceptions where codes do not logically fit within the initial analysis were recorded for future exploration. The process of evaluation thus transforms the coded data into meaningful information. Miles and Huberman (1994) suggested a range of possible strategies to generate meaning from the data. These strategies included counting the occurrence of phenomena, noting the emergent themes and comparing and contrasting data sets through to exploring the relationships between the variables, and determining conceptual theoretical coherence in the data (Coffey & Atkinson, 1996:47). In this study the use of domain analysis (See Section 3.4.5) is employed to identify patterns and meanings, which are then compared and contrasted during interpretation in Chapter 6.

The axial coding process aimed to distinguish possible causes, consequences and reasons for associations between concepts. These were examined and the classification of new categories and groups were sought (Neuman, 2000). As a result of the axial coding process 24 core codes (selective codes) emerged with a further 54 associate categories (axial codes). Table 4-20 presents the set of emergent core codes with associated codes.

Table 4-20. An outline of the Core Codes and Associated Codes found in all cases.

Core Codes (Selective Codes)	Associated Codes (Axial Codes)
Business Background	Nature of Customer EC Clients ISP Clients
Clients	E-mail Intranet SMS
Communication	Electronic Banking Electronic Publishing Electronic Payment Sys Return on Investment EDI Sales Intranet Organisational Change
EC Application	
EC Barrier	
EC Benefits	Customer Service EC Adoption
EC Driver	ISP Problems Internet Fraud EC Costs Organisational Problems Security EC Failure
EC Problems	Competitive Advantage Market Niche Marketing Customer Service Cost Benefit
EC Strategy	EC Support EC Education EC Knowledge
EC Support	
Future	Competition Government ISP Industry
Industry	Marketing Market Research
Internet	ISP services ISP Clients ISP Problems ISP Industry
ISP	IT Infrastructure IT Investment IT Skills
IT Infrastructure	
IT Strategy	IT Skills IT Support
IT Support	Transport / Delivery
Logistics	Management Support Management Problems Organisational Problems
Management	
Product \ Service	
Strategic Alliance	Procurement Distributors / Wholesalers

Supply Chain	
Virtual Business	Web Site Development
Web Site	

4.3.3 Emergent Core Codes

The coding process has transformed the original set of open codes into a set of selective and axial codes. The selective and axial codes are considered to represent core codes and associated codes directly aligned with the utilisation of e-commerce by these case studies. The list of core codes to emerge from the first stage of data analysis is presented in Table 4-22 below.

Table 4-22. A Table of the Core Codes Emergent from the Data

Business Background	EC Problems	IT Strategy
Clients	EC Strategy	IT Support
Communications	EC Support	Management
Distribution	Future	Product
EC Application	Industry	Strategic Alliances
EC Barriers	Internet	Supply Chain
EC Benefits	ISP	Virtual Organisation
EC Driver	IT Infrastructure	Web Site

4.4 Reflections

This chapter has presented the process used to conduct the initial analysis of the data. Follow the principles of grounded theory a set of coding procedures has revealed an array of concepts, themes and relationships from the data. Three representative case examples were selected to represent the coding processes deployed to reveal particular facets of the data.

The chapter outlines the use of open, axial and selective coding procedures for three transcripts based on the case examples. Following a discussion of the codes that emerged for each case the open, axial and selective codes are then mapped back to the research themes associating the emergent data dimensions, links and meanings with the objectives of the research.

In the third section of this chapter, a review of all open, axial and selective codes from all thirty-four case studies is presented. These codes provide an insight into the dimensions and relationships that exist amongst the codes. The selective and axial codes are used in the second part of the data analysis to help navigate the development of domain worksheets, which are fundamental in exploring the meanings and interrelationships within and between these codes across the multiple case studies.

In the next chapter domain analysis is employed to extend the data analysis to a finer level of detail, which is used to compare and contrast the experiences, meanings and views of all cases participating in this study.

5. DATA ANALYSIS PART 2

5.0 Introduction

This chapter provides details of the second stage of data analysis employing domain analysis techniques to compliment the use of grounded theory. In this chapter, the three case examples (X, E, R) used in Chapter 4 are again used to exemplify the domain analysis procedure (See Section 3.4.2). The domain analysis technique cultivates a greater depth of data analysis highlighting the significance of the intrinsic semantic relationships between the key concepts and themes identified in the first stage of data analysis across all cases.

The first section of the chapter describes the steps used to conduct the domain analysis as outlined in the research methodology (See Section 3.4.5). Initially domain analysis worksheets are created for each case study using the codes derived from the grounded theory as domains of analysis. In the second step, a consolidated list of codes relevant to each research theme is established. The consolidated lists of codes guide the assembly of a domain analysis aggregate worksheets for each research theme representing all cases (See Section 3.4.5.1). The aggregate worksheets draw upon elements of the individual domain worksheets to provide a comprehensive domain analysis for each research theme. The creation of the aggregate worksheets provides a highly detailed rich document of interrelationships, experiences, and meanings concerning the utilisation of e-commerce for each research theme.

The second section of the chapter outlines the codes from the three case examples, which are associated to the first research theme: *Why is e-commerce used by SMEs?* (Section 3.4.5.1) A domain analysis aggregate worksheet of the first research theme is presented followed by a discussion of the semantic relationships inherent in the worksheet. The presentation of consolidated codes and aggregate worksheets for the other research themes are described in the third, forth and fifth section of this chapter. The chapter concludes with a summary reflection of the major elements of the domain analyses.

5.1 Part B of Analysis using Domain Analysis Techniques

This chapter expands on the grounded theory data analysis conducted in Chapter 4. The first stage of data analysis using grounded theory revealed core and associate codes related (Table 4-20) to the research themes for each individual case (See Section 1.2.1).

- Why is e-commerce used by SMEs?
- How is e-commerce used by the organisation?
- The impact of e-commerce on the organisation.
- Factors that contribute to the utilisation of e-commerce.
- Factors that presents problems for e-commerce utilisation.

The second stage of data analysis examines in depth the characteristics and inter-relationships between the codes across all cases. The core codes and associated codes are explored as domains in the domain analysis process. Within each research theme the domain analysis collates all the codes across all cases for further analysis. This provides a mechanism to compare and contrast codes from multiple case studies with reference to each research theme.

In this chapter the three case examples (X, E, R) initially analysed in the Chapter 4 (Section 4.2) are used again to exemplify the domain analysis technique used in this study. The domain analysis worksheet for each case (Appendix One pp.233) are combined to provide a aggregate worksheet for each research theme. The domain analysis aggregate worksheet (aggregate worksheet) outlines the attributes and semantic patterns embedded in the data directly from the codes identified in the first stage of data analysis. Figure 5-1 outlines the steps used formulate the aggregate worksheet using case examples (X, E, R).

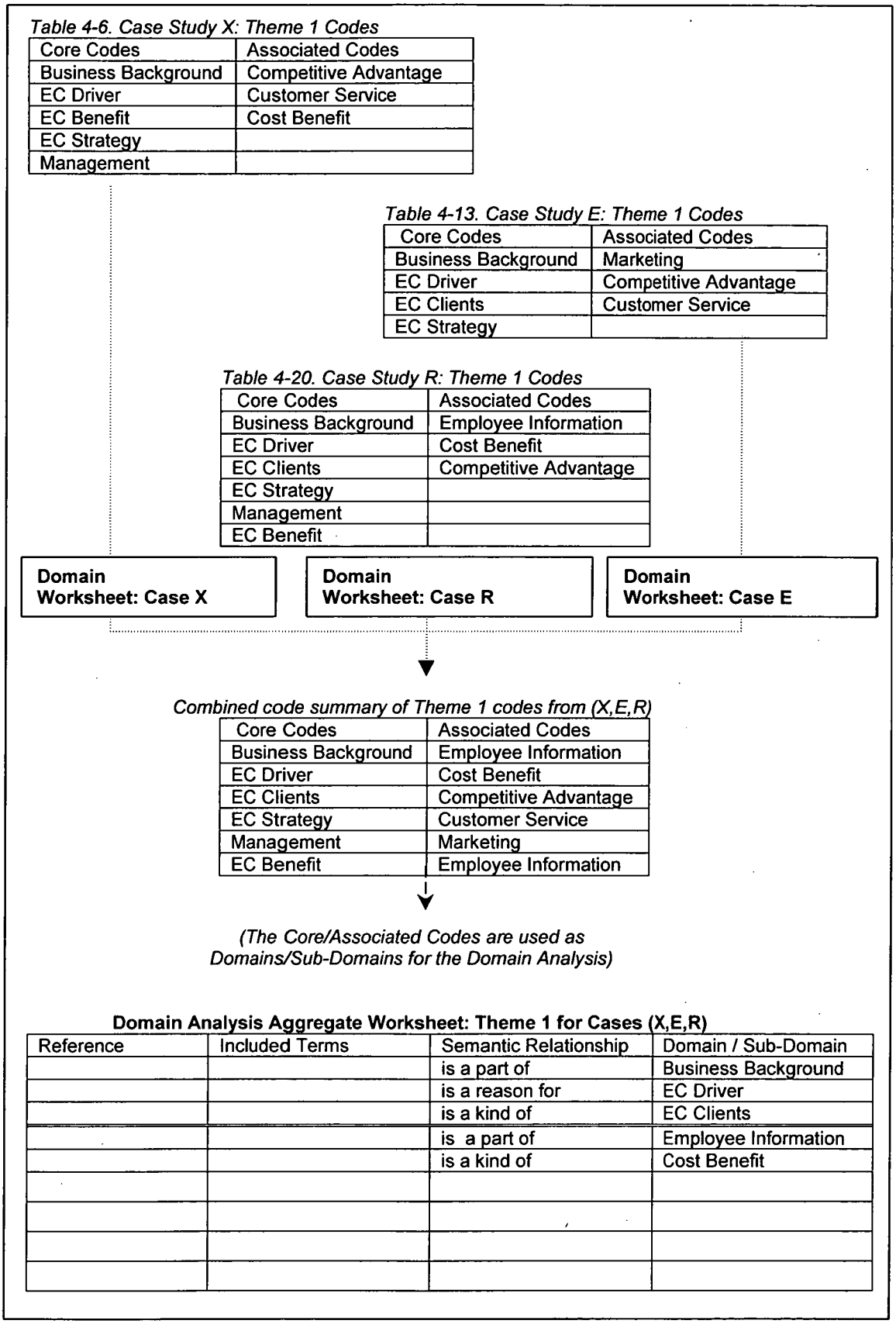

Figure 5-1. The Development of a Domain Analysis Aggregate Worksheet.

This chapter presents a domain analysis summary worksheet for each research theme coinciding with the three case examples (X,E,R). Each summary worksheet contains four components: a *Reference, Included Term, Semantic Relationship* and *Domain.* The *Reference* column uniquely identifies the location of the domain relationship in the data set. The other components have been explained in Chapter 3 (Section 3.4.5).

A discussion of themes with respect to the domain analysis summaries follows in the presentation of the domain worksheets. A detailed outline of the domain analyses for all the cases is provided in the Appendix One (pp.233-245).

5.2 Theme 1: Why is e-commerce used by SMEs?

The main focus of this research is to explore and examine the reasons why e-commerce is used by a range of SMEs. The first-level data analysis used grounded theory to identify a number of core emergent categories related to the utilisation of e-commerce. A consolidated list of codes reflecting individual codes related to Theme 1 is outlined in Table 5-1. The grounded theory analysis of the three case examples highlighted five core codes relating to Theme 1 with a further four associated codes. This section will discuss the inter-relationships and characteristics of the codes that were identified in the first stage of the data analysis.

Table 5-1. Codes from Cases (X,E,R) associated with Theme 1

Core Codes	Associated Codes
EC Driver (X, E, R)	Customer Service (X, E)
EC Strategy (X, E, R)	Competitive Advantage (X, E, R)
EC Benefit (X, R)	Marketing (E)
Management (X,R)	Cost Benefit (X, R)
EC Clients (E, R)	

Initially a domain worksheet is developed to aid in the examination of the data. In developing the domain analysis aggregate worksheet the core codes and associated codes identified from the ground theory analysis (Table 4-20) are used as key domains and sub-domains to be investigated. The role of domain analysis is to explore these linkages between the core codes and the influence of sub-components such as customer service, employee information, competitive advantage, cost benefit and marketing. A detailed table of the domain analysis of the three case examples concerning Theme One is presented below.

Table 5-2. Theme 1: Domain Analysis Aggregate Worksheet (Cases X,E,R)

Why is e-commerce used by SMEs?			
Reference	**Included Terms**	**Semantic Relationship**	**Domain / Sub-Domain**
X-T4, X-T12, E-T6, R-T12	Management	*is a part of*	EC Driver
X-T4	Extend existing business	*is a reason for*	EC Driver
X-T4	Increase market share	*is a reason for*	EC Driver
E-T6	Web Consultant	*is a kind of*	EC Driver
E-T6	Competitors in Industry	*is a reason for*	EC Driver
E-T6	Customer service	*is a reason for*	EC Driver
E-T6	Internet platform	*is a reason for*	EC Driver
E-T6	Differentiate organisation	*is a reason for*	EC Driver

R-T12	Innovative management	*is a reason for*	EC Driver
X-T2, R-T17, E-T2	Reduce operational costs	*is a reason for*	EC Strategy
X-T2, E-T2, E-T8	Provide a customised product	*is a reason for*	EC Strategy
X-T6	Trust customer	*is a part of*	EC Strategy
X-T8	Create a new business entity	*is a part of*	EC Strategy
X-T8	Use e-commerce for retailing	*is a part of*	EC Strategy
X-T28	Long-term return for e-commerce	*is a part of*	EC Strategy
E-T2	Improve business processes	*is a reason for*	EC Strategy
E-T2, E-T4, E-T8, E-T19, E-T39	Enhance customer service	*is a reason for*	EC Strategy
E-T2, E-T4, E-T39	Retain customers	*is a reason for*	EC Strategy
E-T2, R-T43	Provide valued added service	*is a part of*	EC Strategy
E-T4	Use Internet strategically	*is a part of*	EC Strategy
E-T11	new business opportunities	*is a part of*	EC Strategy
E-T37	Difficulty initially developing strategy	*is a part of*	EC Strategy
E-T37	Strategic plan	*is a reason for*	EC Strategy
R-T9, R-T43	Non static web site required	*is a part of*	EC Strategy
R-T9	Interface existing information systems	*is a part of*	EC Strategy
R-T35	Intuitive timing to use e-commerce	*is a characteristic of*	EC Strategy
R-T43	Consult clients with EC development	*is a part of*	EC Strategy
X-T3	Customer convenience	*is a reason for*	EC Benefit
X-T3, R-T19	Instant access to product	*is a reason for*	EC Benefit
X-T3	Increase product choice	*is a kind of*	EC Benefit
R-T8	Attract interstate clients	*is a part of*	EC Benefit
R-T18	'Clean' data format	*is a reason for*	EC Benefit
R-T18	Cost reduction	*is a part of*	EC Benefit
X-T13, R-T45	Knowledge with Technology	*is a characteristic of*	Management
X-T13	Prior EC knowledge	*is a part of*	Management
X-T13, R-T11	Innovative use of technology	*is a part of*	Management
R-T11, R-T45	Low interest in technology	*is a characteristic of*	Management
R-T30	An alternative product delivery	*is a reason for*	EC Clients
R-T30	design web interface for clients	*is used for*	EC Clients
X-T32	Personalised service	*is a part of*	Customer Service
X-T32	Convenience	*is a characteristic of*	Customer Service
E-T27	On-line customer feedback	*is used for*	Customer Service
R-T41	Perceived benefit	*is a result of*	Cost Benefit
X-T10	Economics	*is a part of*	Cost Benefit
X-T23, E-T9	E-commerce strategy	*is used for*	Competitive Adv
X-T23	First mover advantage	*is a way to*	Competitive Adv
X-T23	Existing database of products	*is a part of*	Competitive Adv
R-T40a	Unique product range	*is a part of*	Competitive Adv
R-T40a	Web site	*is used for*	Competitive Adv
E-T34	Cater to a specific niche clientele	*is a part of*	Marketing
E-T34	Use word of mouth	*is a way to*	Marketing

The analysis of the three case examples reveals a range of relationships indicating that the use of e-commerce is influenced by factors internal and external to the organisations. In all cases a pro-active management was the primary driver for the use e-commerce while in Case E external web consultants provided an additional influence. The motivation to use e-commerce includes extending the business into an on-line environment, the chance to increase market share, increase competition or the threat of competition in the industry, enhancing customer service and the opportunity to differentiate the business from competitors.

Amongst the three cases the strategy to use e-commerce as a cost reduction measure was a common incentive. Other e-commerce strategies include the development of new business entities and the creation of an on-line transaction interface.

Figure 5-2 provides a summary of the inter-relationships between the core domains associated to Theme one. The domain analysis worksheet provided the researcher with the attributes associated to each category and also highlighted the possible linkages between the domains.

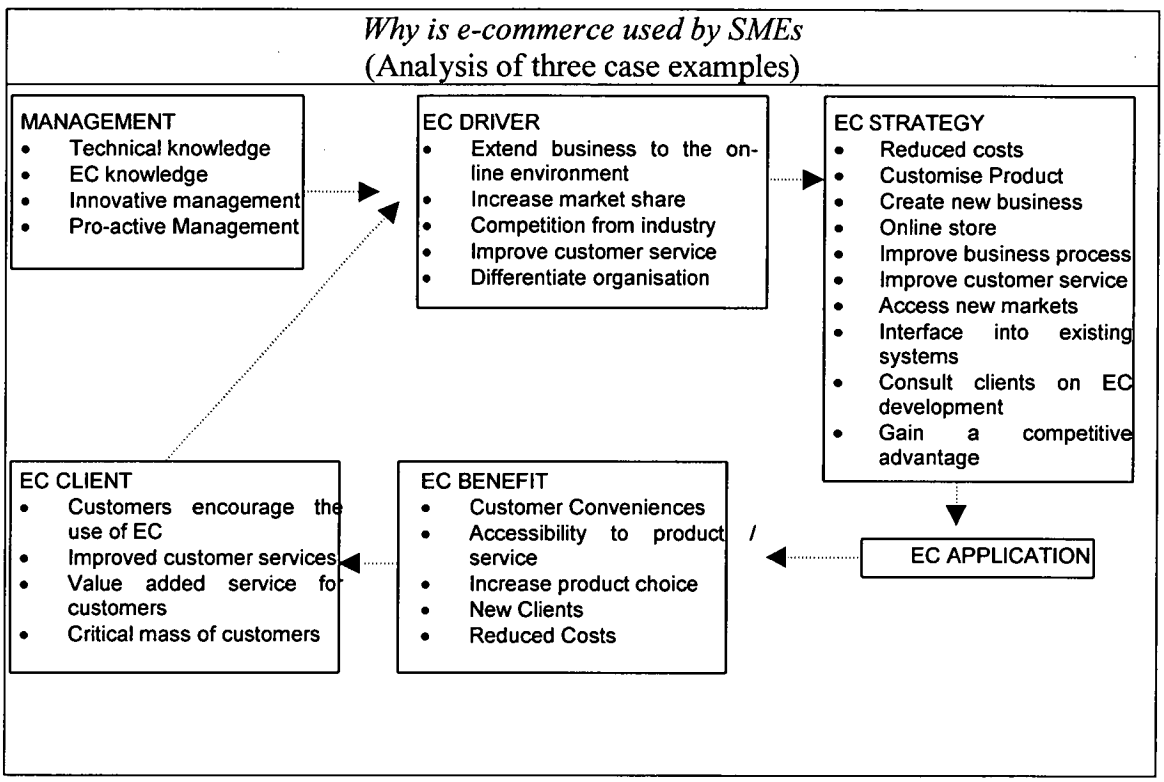

Figure 5-2. Domains and potential relationships associated with the first research theme in the three case examples

- *Management*

What this analysis of the three case examples signifies is the importance of management in providing the initial stimulus to incorporate some form of e-commerce within their organisation. Management plays an important role as an e-commerce driver to formulate an implicit or explicit strategy, and to determine how best to gain potential benefits from e-commerce. The interviewees identified management as the primary driver to support the use of e-commerce. It was evident that the senior management instigated, motivated and nurtured the organisation in the use of e-commerce in all three case examples.

- *E-Commerce Drivers*

A range of "EC drivers" prompted the organisations to use of e-commerce. These can stem from a combination of issues internal and external to the organisation. The pressure of competition in the industry for Case E, plus the encouragement of existing clients to use e-commerce as an alternative trading medium, prompted the

organisation to extend business transactions to the on-line environment. As in Case X and Case R, the business also wanted to increase market share and differentiate itself from competitors. However, the primary driver to use e-commerce varied from one business to another. Although the chance to increase market share and improve sales revenue provided an incentive in some organisations, the ability to improve the existing level of customer service was just as important in these three case examples.

- *E-Commerce Strategy*

The strategy driving the use of e-commerce determines how e-commerce will ultimately be incorporated into the business. The three case examples illustrate various e-commerce strategies, some planned explicitly and some planned implicitly. The use of domain analysis found that a common strategy was to improve the level of customer service through the use of e-commerce. Other strategic goals included the use of e-commerce to develop a new on-line business entity, improving internal business processes, reduce costs, customise the product, and access new markets. As part of the e-commerce planning process in Case E and Case R, consultation with existing clients was an integral component, and providing direct links into existing back office systems was important. In all the three cases the use of e-commerce was seen as a potential method to acquire a competitive advantage over competitors.

- *E-Commerce Benefit*

The potential benefits that e-commerce can provide to the business are associated with the e-commerce driver. The potential benefits highlighted by the data analysis can be acquired internally and externally to the business. External benefits can be reaped from improved communication and transaction functions with various elements along the supply chain, which include clients and suppliers. Internally benefits can be attained through efficient business processes, improved communications with staff and potentially new revenue streams from the on-line environment.

- *E-Commerce Client*

The client becomes an essential element in the e-commerce strategy where organisations envisage using e-commerce to enhance the management of customer relations. A predominant driver found in the three case examples is to use e-commerce to improve customer service or provide value added services for customers. However to acquire the potential benefits from e-commerce there has to be a critical mass of e-commerce users to make the e-commerce component of a business viable. Case R discovered that the initial uptake of the e-commerce system was slow but found within twelve months over 1100 users were actively using the e-commerce system. In some instances the demand or support for an e-commerce system by existing customers prior to development may be favourable, as was found in Case E. The advantage of this situation is that the development can be tailored to customer demands.

5.3 Theme 2: How is e-commerce used by the organisation?

This section examines how e-commerce is used by the organisation. The use of domain analysis revealed the nature of the e-commerce application or systems were directly linked to the strategy and drivers for using e-commerce. The first

level of data analysis identified a set of core codes aligned with the second theme, determining how e-commerce is used by organisations. A consolidated list of codes reflecting individual codes related to Theme 2 is outlined in Table 5-3. Further analysis of the three case examples, used in this chapter suggests other core codes are associated to Theme 2 these include *EC Application, Communications, Internet, Web Site, Strategic Alliances, EC Benefit, Supply Chain* and *EC Clients* with associated codes *E-mail, Costs, Electronic Payment Systems, Web Development* and *Marketing.*

Table 5-3. Codes from Cases (X,E,R) associated with Theme 2

Core Codes	Associated Codes
EC Application (X, E, R)	E-mail (R)
Communications (E, R)	Costs (X)
Internet (R)	Electronic Payment Systems - EPS (X, E)
Web Site (X, R)	Web Development (X)
Strategic Alliances (X)	Marketing (X)
EC Benefit (X)	
Supply Chain (R)	
EC Clients (R)	

The development of the domain analysis aggregate worksheet for Theme 2 utilises the core codes and associated codes identified in the ground theory analysis (Table 4-20) as key domains for investigation. The role of domain analysis is to explore these linkages between the core codes and the influence of sub-components such as e-mail, costs, electronic payment systems, web development and marketing. A detailed table of the domain analysis of the three case examples concerning Theme two is presented below.

Table 5-4. Theme 2: Domain Analysis Aggregate Worksheet (Cases X,E,R)

How E-Commerce is used by SMEs?			
Reference	**Included Terms**	**Semantic Relationship**	**Domain / Sub Domain**
X-T5	Digital product	*is a part of*	EC Application
X-T7	Database of products	*is a part of*	EC Application
E-T5	Alter internal IS systems	*is a part of*	EC Application
E-T5	Provide a value added tool for clients	*is reason for*	EC Application
E-T5, E-T12	Provide a web interface	*is a part of*	EC Application
E-T12	Integrate existing systems	*is a part of*	EC Application
E-T12	Develop application in stages	*is a part of*	EC Application
E-T20	Mirror main database	*is a part of*	EC Application
E-T22	Convert on-line orders to faxes	*is a part of*	EC Application
E-T22	ISP uses a fax router	*is a part of*	EC Application
E-T25	Customised reports for clients	*is a part of*	EC Application
E-T29	No use of electronic payments sys	*is a part of*	EC Application
R-T13	On-line data entry for debt collection	*is a result of*	EC Application
R-T13	On-line credit reporting	*is a result of*	EC Application
R-T15	External web developer	*is a part of*	EC Application
R-T15	Internal IT staff conduct integration	*is a part of*	EC Application
R-T15	Update existing legacy system	*is a part of*	EC Application
R-T20	Provide selected info products	*is a part of*	EC Application
R-T22	Integrate directly to existing system	*is a part of*	EC Application
E-T26, R-T21	E-mail	*is a characteristic of*	Communications
R-T32	Limited staff access	*is a part of*	Internet

R-T31	White pages search facility	*is a reason for*	Internet
X-T15	ISP hosts web site	*is a characteristic of*	Web Site
X-T15	Electronic payment system	*is a characteristic of*	Web Site
R-T37	Improved organisational image	*is a result of*	Web Site
R-T37	Organisational appears innovative	*is a result of*	Web Site
X-T9, X-T18	No formal alliances	*is a part of*	Strategic Alliances
X-T9	Demand for collaboration	*is a part of*	Strategic Alliances
X-T3	Customer convenience	*is a characteristic of*	EC Benefit
X-T3	Provide instant access to product	*is used for*	EC Benefit
X-T3	Provide increase product choice	*is a characteristic of*	EC Benefit
R-T8	Attract interstate clients	*is a part of*	EC Benefit
R-T18	Cost reduction	*is a part of*	EC Benefit
R-T23	Info providers email supply of content	*is a characteristic of*	Supply Chain
R-T10	1100 web site users	*is a characteristic of*	EC Clients
R-T25	Clients can pay by EFT	*is a characteristic of*	EC Clients
R-T30	Web access is an alternative	*is a part of*	EC Clients
R-T30	Information directly entered by clients	*is a part of*	EC Clients
R-T30	Contact management system	*is used for*	EC Clients
R-T30	System is focused at client interface	*is a reason for*	EC Clients
R-T35	Critical mass of clients have web access	*is a characteristic of*	EC Clients
R-T23	Content provision via email	*is a part of*	E-mail
R-T21	Enter debt information using e-forms	*is a part of*	E-mail
R-T33	Important client comms channel	*is a result of*	E-mail
R-T33	Status reports delivered	*is a characteristic of*	E-mail
X-T27	Do-it-yourself development	*is a part of*	Costs
X-T27	Capital Investment	*is a characteristic of*	Costs
X-T16	Provide credit	*is a part of*	EPS
X-T16	Create customer accounts	*is used for*	EPS
X-T16	Transaction audit	*is a part of*	EPS
E-T29	EFTPOS	*is used for*	EPS
X-T14	Programmer is related to family	*is a part of*	Web Developmt
X-T14	Low cost programming rates	*is a reason for*	Web Developmt
X-T26	Business will grow by word of mouth	*is a way to*	Marketing

The domain analysis worksheet provided the researcher with a range of relationships. Each of the domains relate to the how e-commerce is used in the three case examples.

The relationships between three primary domains (EC Application → EC Benefit → and EC Clients) signify some of the inter-relationships that exist in determining how e-commerce is used by SMEs. Figure 5-3 provides a summary of these linkages, which are discussed in detail in the following section. The domains used in this analysis are underlined to highlight their significance.

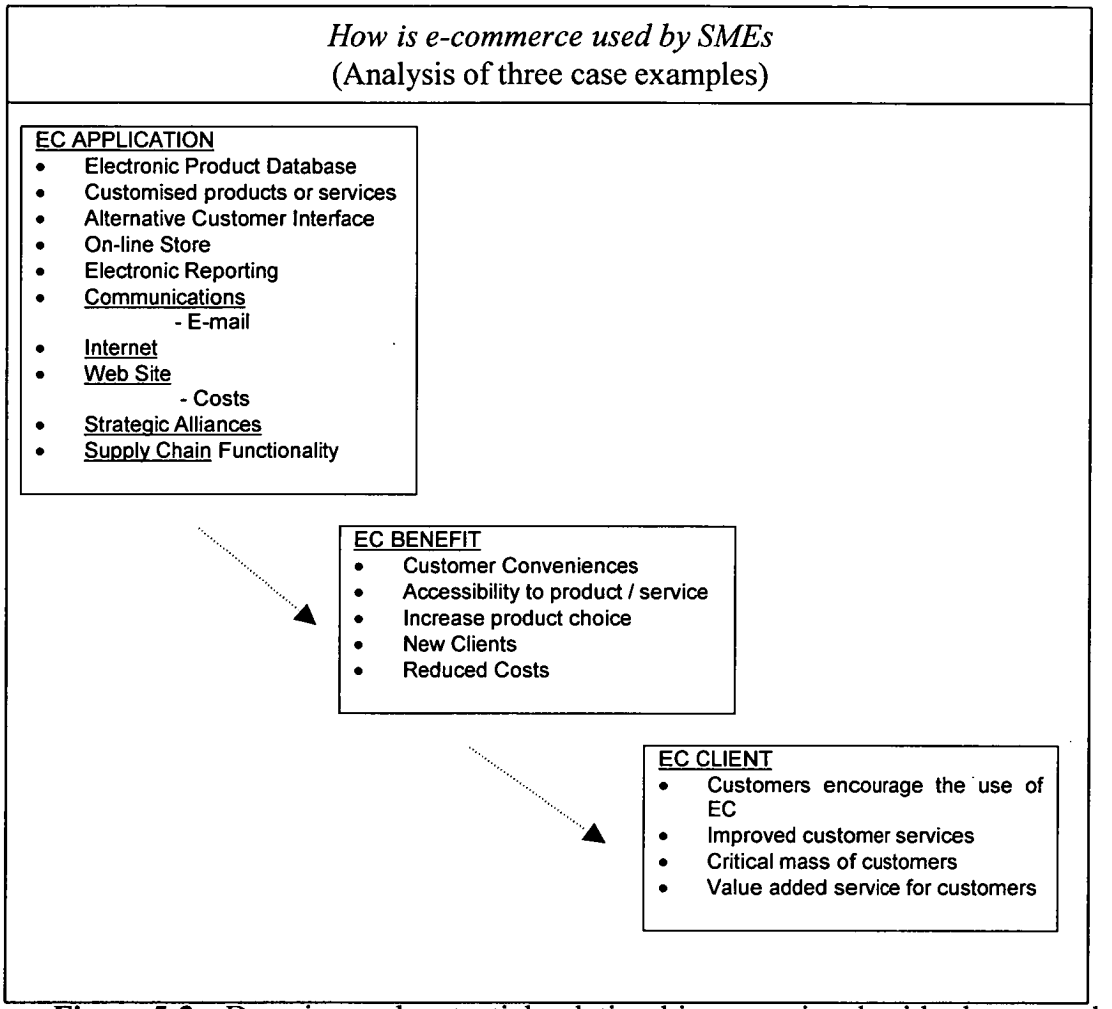

Figure 5-3. Domains and potential relationships associated with the second research theme in the three case examples

- *E-Commerce Application*

The application of e-commerce varies across all cases depending on the e-commerce driver and e-commerce strategy in place. Case X uses e-commerce to trade educational work sheets on-line. The web interface is linked directly to a backend database storing a complete range of digital work sheets. Registered users can download these work sheets at their convenience.

Case E uses e-commerce to primarily extend the existing business into the on-line environment by providing new and existing clients with an alternative trading method. A staged approach was used to develop the e-commerce application. The e-commerce application processes orders for products and provides a unique budgeting tool for corporate clients. Initially orders are faxed through to the business for processing but when the demand for the on-line product increases, fully integration of orders into backend systems can be activated.

Case R provides a debt collection and credit reporting service supplemented by other related newsletters and bulletins. E-commerce is used primarily to provide an alternative reporting system for clients. Traditionally reports were mailed out by post to respective clients. The new e-commerce system enables clients to

access a range of information on-line at their convenience. The web interface is fully integrated into the backend databases, which provide a highly efficient streamlined information system. E-commerce is also used in the supply chain for information updates about debtors and content provision for newsletters and bulletins. Registered clients have the ability to update records about debtors directly through the web site. This enables the information to be current and increases the level of accuracy of debtor records. In the past, much of the content for newsletters was manually collated and entered. The provision of information via e-mail has streamlined the acquisition of information from major content providers which improved efficiency, accuracy and removed the need to re-enter information.

While the hosting of the e-commerce application was provided by Internet service providers for Case X and Case E, CaseR' fully own and manage their e-commerce platform on site at their head office. This is to ensure a higher level of security and control over the system. On-line payment systems were only provided by one business, Case X, but this function was not considered an important part of e-commerce functions for the other cases. Similarly, the formation of strategic alliances was not stated as a major driver for e-commerce even though in Case X, the presence on the Internet attracted offers for collaboration from other businesses.

The use of e-mail is an important Internet technology to facilitate communications between the businesses and entities in their value chains. The use of e-forms provides the foundation for e-commerce applications in each of the three case examples.

- *E-Commerce Benefit*

The business and the users interacting with the e-commerce system can gain benefits from using e-commerce. In Case R the business was able to obtain cost reductions and increased interest from clients located on mainland Australia. The e-commerce system provides these mainland clients with instant access to live credit reporting information and other debt recovery services. This provides a major incentive for clients located remotely to join the list of registered users. The introduction of the e-commerce system in Case R continues to attract clients both locally and nationally. The benefits of increased accessibility and convenience and the ability to download a diverse product range was also noted in Case X. In both cases clients are able to access product information and services with ease, requiring little input from the businesses when compared to conventional trading scenarios that were reliant on telephone, fax and postal services. The use of e-commerce can provide benefits for both the client and the business.

- *E-Commerce Client*

The influence of clients who will potentially use an e-commerce system contributes immensely to the development of the application. The analysis of the three case examples highlights three client factors that are important to consider when embarking on the development of an e-commerce system. Firstly, the ability to consult with clients during the planning and development of the application elevates the potential uptake of the e-commerce system. In Case E and Case R major clients were consulted about the e-commerce development to ensure that

the interface and functions met the interests of the clients. This is only possible where a strong rapport exists between the business and existing clients. Secondly, a critical mass of clients is a major factor for planning an e-commerce application. If a slow uptake of the e-commerce system is envisaged then the business may consider a staged approach to the development as in Case E. Case R predicted a large population of existing clients to use the new e-commerce system consequently they upgraded their backend database to an Oracle platform and hosted the web site in-house. Finally, the ability to determine if customers have the necessary resources and time to trade with the business electronically is important. Discussions with customers in Case E and Case R ensured that a significant population of clients were e-mail and Internet ready, thus justifying in part the use of e-commerce.

This section has provided an analysis of how e-commerce is used by the three example case studies. An extensive interpretation of all cases included in this study is presented in Chapter 6. The following section presents a data analysis of the organisational changes attributed to e-commerce in Cases X, E and R.

5.4 Theme 3: The Impact of E-Commerce on the Organisation

This section presents a discussion of the how domain analysis is used to explore the organisational changes attributed to e-commerce. Following the coding practices performed in the initial data analysis, the emergent codes are further investigated for possible relationships that exist in regards to the impact of e-commerce on the organisation. A consolidated list of codes reflecting individual codes related to Theme 3 is outlined in Table 5-5. The first stage of data analysis using grounded theory revealed six core codes; *EC Application, IT Infrastructure, Management, Strategic Alliances, Product* and *EC Clients* and three associated codes; *Organisational Change, Electronic Payment Systems* and *Costs*.

Table 5-5. Codes from Cases (X,E,R) associated with Theme 3

Core Codes	Associated Codes
EC Application (X, E, R)	Organisational change (R)
IT Infrastructure (E, R)	Electronic Payment Systems (X, E)
Management (X, E, R)	Costs (X)
Strategic Alliances (X)	
Product (X, E)	
EC Clients (R)	

The nature of these codes and their interrelationships with respect to organisational change is discussed in this section. These codes are used to develop a domain analysis aggregate worksheet for theme three, the core codes and associated codes identified in the ground theory analysis (Table 4-20) are used as key domains for investigation. The aggregate worksheet of the three case examples related to Theme three is presented below.

Table 5-6. Theme 3: Domain Analysis Aggregate Worksheet (Cases X,E,R)

Impact of E-Commerce on the Organisation			
Reference	**Included Terms**	**Semantic Relationship**	**Cover Terms**
E-T5	Alter internal IS systems	*is a part of*	EC Application
E-T5	Provide a value added tool for clients	*is reason for*	EC Application
E-T5, E-T12	Provide a web interface	*is a part of*	EC Application
E-T12	Integrate existing systems	*is a part of*	EC Application
E-T12	Develop application in stages	*is a part of*	EC Application
E-T20	Mirror main database	*is a part of*	EC Application
E-T22	Convert on-line orders to faxes	*is a part of*	EC Application
E-T22	ISP uses a fax router	*is a part of*	EC Application
E-T25	Customised reports for clients	*is a part of*	EC Application
E-T29	No use of electronic payments sys	*is a part of*	EC Application
X-T5	Digital product	*is a part of*	EC Application
X-T7	Database of products	*is a characteristic of*	EC Application
R-T13	On-line data entry for debt collection	*is a result of*	EC Application
R-T13	On-line credit reporting	*is a result of*	EC Application
R-T15*	Update existing legacy system	*is a part of*	EC Application
R-T22*	Integrate directly to existing system	*is a part of*	EC Application
E-T15	Network localised to head office	*is a stage of*	IT Infrastructure
E-T15	Future network expansion	*is a part of*	IT Infrastructure
R-T16*	Create a new client interface	*is a part of*	IT Infrastructure
R-T46*	Upgrade existing networks	*is a part of*	IT Infrastructure
R-T46*	Host web site internally (for security)	*is a part of*	IT Infrastructure
E-T18	Management motivate staff	*is a characteristic of*	Management
E-T17	Staff are computer literate	*is a result of*	Management
R-T11	Management wanted to use EC	*is a part of*	Management
X-T13, R-T45	Knowledge with Technology	*is a characteristic of*	Management
X-T13	Prior EC knowledge	*is a characteristic of*	Management
X-T9	External content provider	*is a kind of*	Strategic Alliances
X-T9	Demand for collaboration	*is a part of*	Strategic Alliances
X-T18	No desire to form alliances	*is a stage of*	Strategic Alliances
X-T20	Providing a quality product	*is a part of*	Product
X-T20	Cost effective to produce	*is a characteristic of*	Product
X-T20	Convenient to manipulate	*is a part of*	Product
E-T31	On-line product range	*is a characteristic of*	Product
R-T30+	Clients can directly input to database	*is reason for*	EC Clients
R-T30+	An alternative product delivery	*is a reason for*	EC Clients
R-T30	Design web interface for clients	*is used for*	EC Clients
X-T27	Capital Investment	*is a characteristic of*	Costs
X-T27	Do-it-yourself development	*is a part of*	Costs
R-T18	More work required	*is a reason for*	Org Change
R-T18	New process created	*is a reason for*	Org Change
R-T29	Existing processes unchanged	*is a part of*	Org Change
R-T29, R-T31	EC application is transparent to staff	*is a part of*	Org Change
R-T31	Streamline existing work	*is a cause of*	Org Change
R-T31	Provide new work tools	*is a cause of*	Org Change
X-T16	Provide credit	*is a part of*	EPS
X-T16	Create customer accounts	*is a part of*	EPS
X-T16	Transaction audit	*is a part of*	EPS
E-T29	EFTPOS	*is used for*	EPS

* Although changes to organisation occurred. The effect of change for internal staff was transparent.
+ These indicate changes in how the organisation conducted business with clients

The analysis of the domains relating to the third Theme indicates several domains exert an influence in organisational changes attributed to e-commerce. In the domain analysis of the three case examples potential relationships *between Management , EC Application, IT Infrastructure* and the *EC Client* are detected. Figure 5-4 illustrated these potential relationships graphically. The domains used in this analysis are underlined to highlight their significance. A discussion of these domains and their inter-relationships are presented in this section.

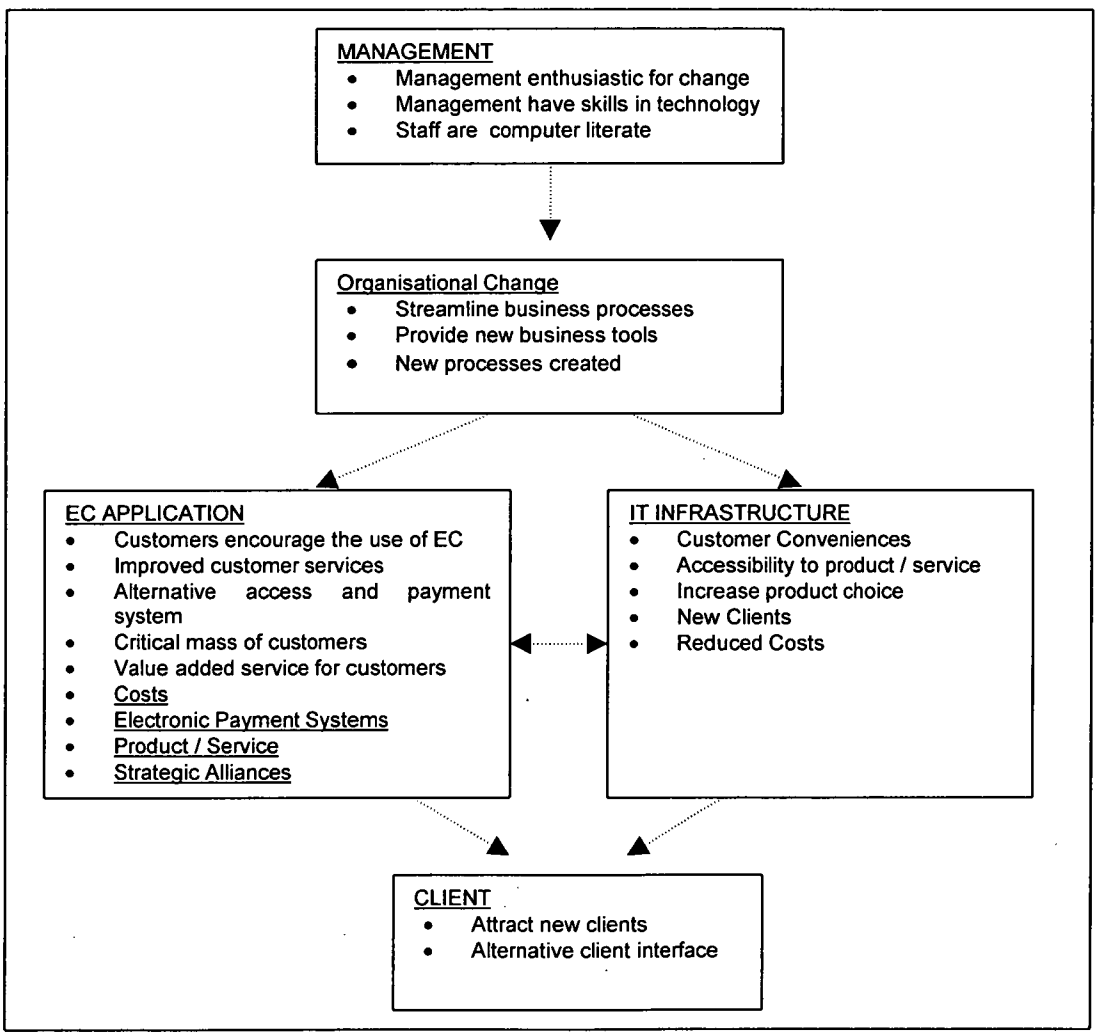

Figure 5-4. Potential relationships between the domains associated with the third research theme in the three case examples

The organisational changes attributed to e-commerce affect many aspects of the business, both internally and externally. The external impact of e-commerce may change the way the business communicates along the value chain. Interaction with customers and suppliers may change. Internally e-commerce may require changes to the organisation's IT infrastructure and business processes. The three example

cases used in this section illustrate a range of e-commerce implementations with different degrees of organisational change attributed to e-commerce.

5.4.1 Internal changes attributed to E-Commerce

- *Management, EC Application, IT Infrastructure*

Management in Case E has used e-commerce to expand the sale of products from conventional trading methods to include the Internet. Although the e-commerce application has the capacity to fully integrate its web interface automatically into backend information systems, the business decided to initially print out all on-line orders for conventional order entry. Orders received through fax haven't changed any of the organisation's order entry processes but if the automated approach using the web interface was initiated a reduction in manually order entry would result in associated efficiencies, such as error reduction. In either case the role of staff responsible for orders would not be directly affected.

E-commerce has been used in Case R to improve operational efficiencies and reduce costs within the existing information structure. The business fundamentally utilises e-commerce to streamline the entry of debt collection information and the production of credit reports. Clients have the ability to directly enter information into the organisation's database, which has significantly reduced the need for manual entry of debtor's information. Bulk lodgements of new debtors can also be automated from major customers using e-mail attachments and software conversion tools. The most significant change to the business attributed to e-commerce has been to the existing IT infrastructure. The development of new e-commerce systems has also prompted an upgrade of the existing database platform and other changes to the existing IS structure. Although these changes are technically significant, the incorporation of the e-commerce has largely been transparent for most staff in the business.

Case X differs from other businesses in that the management decided to establish a new business targeting the on-line marketplace as the sole marketing and sales mechanism. Instead of expanding the original business to have an on-line presence, the owners decided on developing a new business registered as a separate entity. The advantage of this is that the development of CaseX' can be constructed without any organisational barriers that may have existed. The business uses e-commerce in every aspect of the business to ensure operational efficiencies. E-commerce is used for order entry, storage, delivery and payment of the product. Essentially the business is a virtual enterprise (see 6.2.3) and requires little input from the owners and for the most part is self-sufficient once new clients are registered. The cost associated with constructing the e-commerce application was minimal as a family friend developed a major proportion of the system. The ability to acquire the web development skills from a friend provided a major incentive to establish the business. The web site created by Case X has attracted offers to form strategic alliances with other businesses. The nature of these alliances was to sell other complementary products. However management declined offers in order to retain control of their products and reputation. Case X does have a relationship with an agent in the UK providing local content but the control of the products remains with the Australian management.

5.4.2 External changes attributed to E-Commerce

- *EC Client*

The introduction of e-commerce within a business can change the manner in which clients communicate and trade with the business. If the strategy to use e-commerce is customer centric the interaction between the business and the client can change. Potential benefits accrued to e-commerce may be reaped by the business and the e-commerce client.

In each of the three case examples, e-commerce is used with the transaction process between the customer and the business. In Case R and Case E customers have the choice to use e-commerce or a conventional approach to trade with the business. Significant advantages are reaped by CaseR' if clients wish to interact with the business electronically. Information received from clients using e-commerce in Case R is already in digital format ready for storage or manipulation. The time to send and process the information is significantly reduced when compared to the conventional process of re-keying in paper based information into the business' database. The impact of the e-commerce for this business is a faster manipulation of data, utilising a process that is highly accurate and cost effective.

CaseE' has the capacity to acquire similar benefits to CaseR' through automating product orders by linking the e-commerce application into backend systems but have decided to initially process on-line orders in the conventional manner with no electronic links to backend systems. Consequently there is little change in the organisational processes but integration of an e-commerce application with existing information systems could reveal increased efficiencies when dealing with product orders. The answering of order status enquires has changed significantly for the business by providing on-line users with the ability to check order details themselves. This has reduced the need to allocate organisational resources to many customer service duties.

- *Supply Chain, Electronic Payment Systems*

The focus of e-commerce systems developed by these three case examples is primarily aimed at the customer side of business operations although other aspects of the business can be affected by e-commerce. The use of e-commerce along the supply chain is limited to e-mail communications at most. As a consequence the use of e-commerce for supply chain activities has not substantially changed the business. CaseR' has been fortunate enough to acquire some of its information content electronically from suppliers which has brought about advantages but not all suppliers are able to provide content electronically. Case X is fortunate that most of their raw products are sourced from a parent organisation and they have also attracted offers to retail other products but have declined affiliation with third party organisations to retain control and quality over their own product range.

Electronic payment systems have not been supported by Cases E and Case R for on-line transactions but these businesses do use electronic banking for other administrative tasks. Electronic payment systems are not considered a necessary function of the e-commerce system. However Case X which trades solely on the Internet have developed their own electronic payment system to automate as

much of the on-line business as possible requiring very little intervention by the business owners.

5.5 Theme 4: Factors that contribute to the utilisation of e-commerce

There is an array of apparent factors that effect any business decision. Some are controllable and many are not. A consolidated list of codes reflecting individual codes related to Theme 4 is outlined in Table 5-6. The coding procedures revealed a range of inherent factors attributed to the utilisation of e-commerce. High-level coding procedures performed in the initial phase of the data analysis revealed twenty-two distinct factors from just three case examples.

Table 5-6. Codes from Cases (X,E,R) associated with Theme 4

Code Codes	Associated Codes
Business Background (X, E, R)	Training (E)
Management (X, E, R)	Competition (X, E, R)
EC Problems (X, E, R)	Security (X, R)
Industry (X, E, R)	Web Development (X)
Strategic Alliances (X)	Marketing (E)
Internet (X, R)	Competitive Advantage (E)
Product (X, E)	Customer Service (E)
EC Support (E,R)	Government (R)
Web Site (E, X)	
EC Strategy (X, E, R)	
EC Clients (E, R)	
IT Infrastructure (R)	
Supply Chain (E, R)	
EC Driver (X, E, R)	

The factors affecting the utilisation of e-commerce were examined further using domain analysis to discover the nature of the factors and any possible relationships that may be evident between them. The results of the domain analysis are presented in Table 5-7 below.

Table 5-7. Theme 4: Domain Analysis Aggregate Worksheet (Cases X,E,R)

Factors that contribute to the utilisation of e-commerce

Reference	Included Terms	Semantic Relationship	Cover Terms
X-T1	Management developed business strategy	*is a part of*	Business Background
X-T1	Experiment with on-line environment	*is a part of*	Business Background
X-T17	Office in UK	*is a part of*	Business Background
X-T13	Business is from a competitor	*is a part of*	Business Background
E-T1	Corporate apparel distributor	*is a part of*	Business Background
E-T14	Regional office North of State	*is a characteristic of*	Business Background
R-T7	Provider of credit information services	*is a characteristic of*	Business Background
R-T6	Collect debt information	*is a characteristic of*	Business Background
R-T3	State wide information service	*is a characteristic of*	Business Background
R-T28	Established business over 100 yrs old	*is a characteristic of*	Business Background
E-T18	Management motivate staff	*is a characteristic of*	Management

X-T13	Technology conscious	*is a characteristic of*	Management
X-T13	Prior experience with web businesses	*is a characteristic of*	Management
X-T13	Previous expertise with product	*is a characteristic of*	Management
R-T11	Management wanted to use EC	*is a part of*	Management
R-T45	IT knowledge in management	*is a characteristic of*	Management
E-T6	Competitive Industry	*is a reason for*	EC Driver
E-T6	Provide unique service to customers	*is a reason for*	EC Driver
E-T6	Differentiate business from competitors	*is a reason for*	EC Driver
R-T12, X-T4	Innovative management	*is a reason for*	EC Driver
R-T12, X-T4, E-T6	Management decision to use EC	*is a reason for*	EC Driver
X-T2	Reduce production costs	*is a reason for*	EC Strategy
X-T2, E-T2, E-T8	Provide a customised product	*is a reason for*	EC Strategy
X-T2, E-T2	Reduced costs for customer	*is a part of*	EC Strategy
X-T6	Trust customer	*is a part of*	EC Strategy
X-T8	Create a new business entity	*is a stage of*	EC Strategy
X-T8	Use e-commerce for retailing	*is a part of*	EC Strategy
X-T28	Long-term return for e-commerce	*is a part of*	EC Strategy
E-T2	Improve business processes	*is a reason for*	EC Strategy
E-T2, E-T4, E-T8, E-T19, E-T39	Enhance customer service	*is a reason for*	EC Strategy
E-T2, E-T4, E-T39	Retain customers	*is a reason for*	EC Strategy
E-T2	Provide valued added service	*is a part of*	EC Strategy
E-T4	Use Internet strategically	*is a part of*	EC Strategy
E-T11	new business opportunities	*is a part of*	EC Strategy
E-T37	Difficulty initially developing strategy	*is a stage of*	EC Strategy
E-T37	Strategic plan	*is a part of*	EC Strategy
R-T9, R-T43	Wanted more than a static web site	*is a part of*	EC Strategy
R-T9	Interface existing products	*is a part of*	EC Strategy
R-T17	Aim to reduce costs	*is a reason for*	EC Strategy
R-T35	Many clients have web access	*is a reason for*	EC Strategy
R-T35	Intuitive timing to use e-commerce	*is a characteristic of*	EC Strategy
R-T43	Consultation with clients	*is a part of*	EC Strategy
X-T5	Trading digital products	*is a part of*	EC Application
E-T5	Providing value added service	*is a reason for*	EC Application
E-T5,R-T15	Changes to existing IS system	*is a part of*	EC Application
E-T12	Integrate EC with existing IS system	*is a stage of*	EC Application
E-T16	Web interface	*is a characteristic of*	EC Application
E-T22	Fax routing software	*is a part of*	EC Application
E-T22	Dial up access	*is a characteristic of*	EC Application
E-T25	Customer interaction with EC system	*is a characteristic of*	EC Application
R-T13	EC is a part of the business processes	*is a part of*	EC Application
R-T15	Use external expertise for development	*is a part of*	EC Application
R-T36	Organisational control of EC system	*is a part of*	EC Application
R-T21	E-mail communication	*is a part of*	EC Application
R-T31	Streamline operational tasks	*is a part of*	EC Application
E-T23	Management oversees support	*is a characteristic of*	EC Support
E-T23	Management plays an active role	*is a characteristic of*	EC Support
R-T26	Internal IT staff	*is a characteristic of*	EC Support
E-T21, X-T15	ISP hosted	*is a part of*	Web Site
X-T15	Electronic payment mechanism	*is a part of*	Web Site
R-T16	Create a new client interface	*is a part of*	IT Infrastructure
R-T46	Upgrade existing networks	*is a part of*	IT Infrastructure
R-T46	Host web site internally (security)	*is a part of*	IT Infrastructure
R-T46	Low initial technical knowledge about	*is a part of*	IT Infrastructure

	EC		
E-T3	Customers encourage EC	*is a part of*	EC Clients
E-T7	Clients are computer literate	*is a part of*	EC Clients
E-T7, E-T28	Clients encourage e-commerce activity	*is a characteristic of*	EC Clients
E-T28	Customers have access to Internet	*is a characteristic of*	EC Clients
E-T30	Corporate customers located locally	*is a part of*	EC Clients
E-T30	Corporate customers are target market	*is a part of*	EC Clients
R-T10	Hard to encourage users initially	*is a characteristic of*	EC Clients
R-T35	Many clients have web access	*is a characteristic of*	EC Clients
R-T30	Ability for clients to contribute to database	*is reason for*	EC Clients
R-T30	An alternative product delivery	*is a reason for*	EC Clients
R-T30	Design web interface for clients	*is used for*	EC Clients
X-T11	Slow Internet Uptake	*is a characteristic of*	Internet
X-T11	Internet too slow	*is a characteristic of*	Internet
X-T11	Internet not user friendly	*is a characteristic of*	Internet
R-T32	Staff abused use of Internet	*is a part of*	Internet
R-T32	Internet access not productive	*is a part of*	Internet
X-T24	Lack of competitors	*is a stage of*	Industry
E-T40	Highly competitive industry	*is a part of*	Industry
R-T38	Competition has consolidated	*is a part of*	Industry
R-T23	Content use to be manually imputed	*is a characteristic of*	Supply Chain
R-T23	Content providers supply electronically	*is a characteristic of*	Supply Chain
E-T24	Not using EC with suppliers	*is a part of*	Supply Chain
E-T24	Constant orders every few days	*is a part of*	Supply Chain
E-T24	Consider EC in the future	*is a part of*	Supply Chain
X-T9, X-T18	No formal alliances	*is a part of*	Strategic Alliances
X-T9	Demand for collaboration	*is a part of*	Strategic Alliances
R-T42	Government subsidised development	*is a reason for*	Government
R-T42	EC project would begin without government help	*is a part of*	Government
X-T20	Providing a quality product	*is a part of*	Product
X-T20	Cost effective to produce digital product	*is a characteristic of*	Product
X-T20	Convenient to manipulate	*is a part of*	Product
E-T31	On-line product range	*is a characteristic of*	Product
E-T10	Competitors not using EC with clients	*is a part of*	Competition
E-T10	Competitors located locally, nationally	*is a part of*	Competition
E-T10	Suppliers are potential competitors	*is a kind of*	Competition
E-T40	Competitive advantage desired	*is a reason for*	Competition
E-T40	Innovation	*is a result of*	Competition
R-T38	Org is market leader in the State	*is a way to*	Competition
R-T5, R-T38	Interstate competition	*is a part of*	Competition
R-T40	Provide more services than competition	*is a way to*	Competition
R-T40	Provide a unique product range	*is a way to*	Competition
E-T17	Staff are computer literate	*is a result of*	Training
R-T47	Concerned about security	*is a part of*	Security
R-T47	Develop own security system	*is a result of*	Security
R-T47	Need to protect existing info system	*is a reason for*	Security
X-T14	Web site developer a family friend	*is a part of*	Web Development

X-T14	Cheaper programming rates	*is a reason for*	Web Development
E-T34, X-T26	Word of mouth marketing	*is a characteristic of*	Marketing
E-T34	Competitive Adv sought from EC	*is a reason for*	Marketing
E-T9	E-commerce	*is used for*	Competitive Adv
E-T6	Differentiate business from competitors	*is used for*	Competitive Adv
E-T27	On-line feedback	*is used for*	Customer Service

The analysis of the domains relating to the Theme four indicates multiple factors contribute to the use of e-commerce in the three case examples. These factors can be categorised into internal factors and external factors. A graphical representation of these factors is presented in Figure 5-5. A discussion of these domains and their inter-relationships are presented in this section.

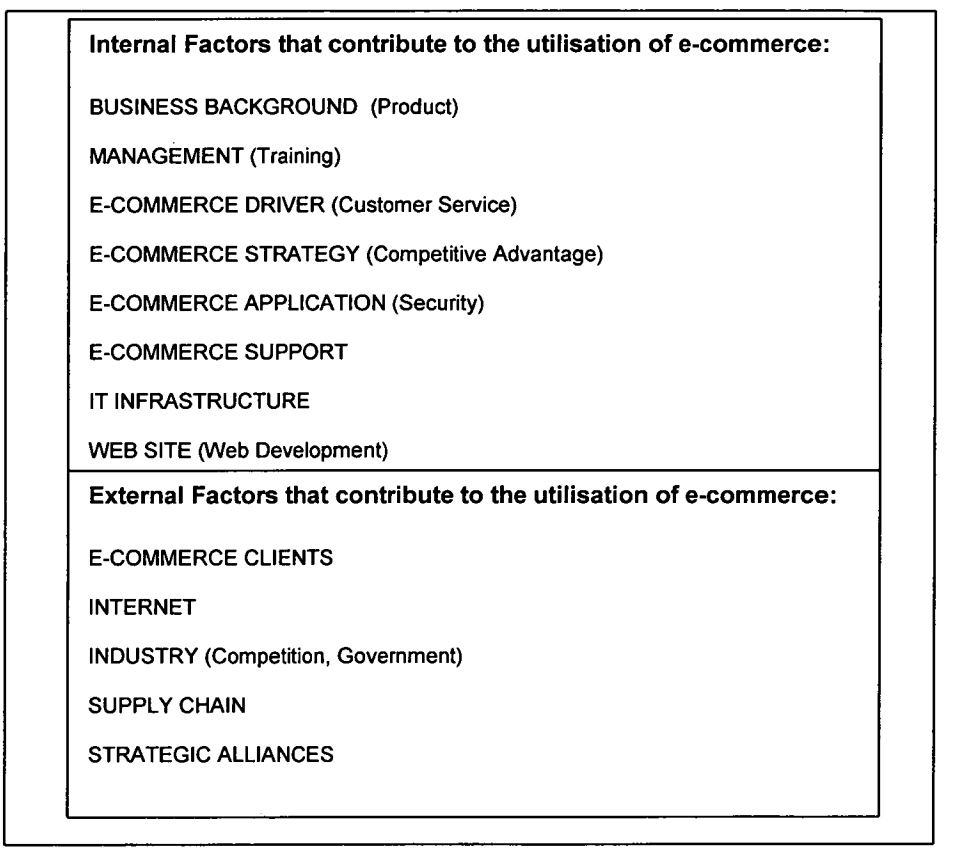

Figure 5-5. Factors that contribute to the utilisation of e-commerce derived from the three case examples

The analysis of the data reveals thirteen major factors that contribute to the utilisation of e-commerce in the three case examples. The background of the business and the nature of the product and services provided by the business can influence the utilisation of e-commerce. A discussion of the internal and external factors identified in the three case examples is discussed in section 5.5.1 and section 5.5.2.

5.5.1 Internal Factors contributing to the Utilisation of E-Commerce:

- *Business Background: (Product)*

The background of the business has a direct influence on the e-commerce utilisation within the business. In all three cases the focus of their e-commerce activities is to enhance their interaction with the end customers, who generally consist of the general public. In Case X and Case R their product is information based and so highly conducive to e-commerce trading. The trade in information products offers more potential e-commerce benefits compared to physical products traded by Case E. The collaboration and communication with branch offices interstate or overseas provides a worthwhile incentive for the adoption and utilisation of e-commerce.

- *Management: (Training)*

The role of management in SMEs is considered key to deriving benefit from e-commerce. In the three case examples, management have been decisive and enthusiastic about implementing e-commerce within their business. A comparison of management across the three examples found that Case R was the only business where management was professionally trained in IT. In the other two example cases the management had some prior experience with web business or IT but no formal IT training. A common attribute across Cases (X,E,R) was that management made the primary decision to promote the use e-commerce. In Case E and Case R the staff were already computer literate and the extra training required operating new e-commerce application found to be was minimal.

- *E-Commerce Driver: (Customer Service)*

The factors driving e-commerce directly influence the type and use of e-commerce adopted by the business. Drivers reported by the three examples include competitive pressures of the industry, innovative management philosophies and the desire to improve the management of customer relations. Other significant factors that drive e-commerce are the potential to reduce costs and the opportunity to access a large customer market.

- *E-Commerce Strategy: (Competitive Advantage)*

How e-commerce is used by the business is directly linked to the factor(s) driving e-commerce. The types of e-commerce strategies discussed in the three examples are linked back to the three major e-commerce drivers. The motivation to be competitive and retain a market share in a competitive industry dictates to some degree the e-commerce strategy. To address the high level of competition faced by Case E, the use e-commerce is aimed at retaining existing customers, and improving business processes and levels of customer service. An explicit e-commerce strategy was formulated to apply e-commerce to employ the Internet strategically to provide value-added service to customers. It was also an attempt to differentiate the business from competitors in a quest to gain a competitive advantage.

Case X identified an opportunity to digitise its products for resale in the on-line environment. The creation of a new business entity to trade solely on the Internet

was a strategic decision based on a set of drivers identified by management. These include reduced production costs and increased customer value, providing a satisfactory incentive to use e-commerce.

The innovative use of e-commerce by Case R was a strategic decision by management. The integrated approach of linking on-line customers directly with the organisational IS infrastructure was developed in consultation with core clients. The realisation that a significant number of users were e-commerce enabled indicated that the timing was indeed appropriate to integrate e-commerce functionality into the existing business model.

- *E-Commerce Application: (Marketing, Security)*

The nature of the e-commerce application determines the potential benefits derived from e-commerce. In Case X the primary purpose of the e-commerce application is to market and retail a digital product to an on-line market. E-commerce provides significant advantages for both the consumer and the business selling the product. A constraint on the business model is the determination of a critical mass of consumers willing to use the service. Similarly in Case E and Case R advantages are available for both the business and the clients. Business R has the potential to gain a higher advantage from e-commerce than business E because of the higher level of e-commerce integration into existing systems. Both Case E and Case R are likely to gain a faster return on their e-commerce investment than Case X as their e-commerce systems are targeted at an established client base. The decision to host the e-commerce system internally as in Case R or via an ISP as in Case X and Case E depend on the amount of control and security required. Having the e-commerce application hosted by an external organisation does present possible problems as were discussed in Section 5.6.

- *E-Commerce Support:*

Management provided the first instance of e-commerce support in all the case examples. For those businesses that do not possess internal IT support staff, complex e-commerce problems are contracted out to external service providers. The ability to support and maintain an e-commerce application can influence the on-going success and benefits attributed to e-commerce. If external providers are required for all aspects of e-commerce support and maintenance the associated costs can be highly significant, particularly for small and micro businesses.

- *IT Infrastructure:*

Depending on the nature of the e-commerce system the associated IT support infrastructures may be extremely complex and costly or simple and affordable.
In Case X and Case E minimal computer hardware was required as the existing computer equipment was used for the development, and the e-commerce application was hosted by an independent ISP. In contrast, Case R totally revised their existing IT infrastructure and decided to host their e-commerce system in-house. This provided an extra level of security and control over their e-commerce system, which would not be attainable with Case X and Case R.

- *Web Site: (Web Site Development)*

The decision to develop the e-commerce system in-house or use external developers can significantly effect the utilisation of e-commerce. Each scenario has its costs and benefits. The decision lies with the inherent expertise, motivation and budgetary limitations evident in each business. In Case X and Case R the e-commerce systems were primarily developed in-house while in Case E external developers were used. The opportunity to use family friends as in Case X to provide e-commerce development and support can influence the overall costs and control and quality of the web development process.

5.5.2 External Factors contributing to the Utilisation of E-Commerce

- *E-Commerce Client*

The clients that interact with the e-commerce application are an important factor in the utilisation of the e-commerce by the business. In the examples given in this chapter the majority of clients represent the consumer side of the transaction as opposed to suppliers of materials and products. In Case E and Case R the focus of their e-commerce applications is to service those established, highly valued, customers with whom the business already has a rapport. The ability to predetermine the user groups in Case E and Case R provides increased potential e-commerce benefits for these businesses as the businesses were able to pre-evaluate and refine the e-commerce developments with selective users providing valuable feedback prior to the final launch of the system. In both of these cases existing clients encouraged the development and implementation of the e-commerce systems. The close rapport with existing clients enabled these businesses to estimate the potential demand and capabilities of clients to use e-commerce and this influenced the strategy regarding how best to implement e-commerce technologies. In contrast, the development Case X e-commerce application was for an indeterminate base of educational professionals where the location and capabilities of the target market are unknown. This presents a range of possible problems for Case X regarding the functionality of the application, the identification of the client base and the market testing of the product.

- *Internet*

Case X considered the Internet to be too complex, slow and inaccessible for many of their customer base. Management in Case X believed that when these problems of the Internet are addressed the relative success of their business can increase. Case X uses the Internet as a sales, marketing and communication platform for all of its customers. Alternatively Cases E and R still retain conventional operational systems but use the Internet to provide an alternative interaction interface with existing clients. The Internet is used to facilitate their e-commerce activity. Although significant e-commerce benefits are apparent for clients of Case R, both Case R and Case E do not need to rely on the Internet for their business survival. Case R only uses the Internet as a medium to enhance client interaction. The business does have the option to use a private network with selective clients. Interestingly Case R does not provide Internet access to the majority of its employees.

- *Industry (Competition, Government)*

The influence from industry was mixed across the three case examples. Case E operated in a highly competitive industry and one of the main reasons for using e-commerce was to differentiate it from competitors. In comparison Case X and Case R had few competitors and so the influence of industry was not a major factor in deciding to use e-commerce.

The government had a minor influence in the utilisation of e-commerce. Case R was fortunate enough to acquire a financial grant for the development their e-commerce application. The assistance provided by the government body was purely financial in this instance although since conducting these interviews other government initiatives to help SMEs adopt and utilise e-commerce have been made available.

- *Supply Chain*

The use of e-commerce along the supply chains of the three case examples was heavily skewed towards to the customer end. The use of e-commerce with suppliers was not a major consideration or significant driver for e-commerce. Only Case R gained benefits from e-commerce by using e-mail with suppliers. The use of phone and fax still dominated all communication and, to a lesser extent, e-mail as far as negotiations with suppliers were concerned among the three case examples.

- *Strategic Alliances:*

The three businesses did not consider or pursue the formation of strategic alliances as an essential part of using e-commerce. However Case X did attract independent businesses that wanted to collaborate with them in their use of their web site. This was declined in order to retain the quality and control over their web presence.

5.6 Theme 5: Factors that presents problems for E-Commerce utilisation

In any project that involves technology the potential for risk and problems are always apparent. The development and implementation of e-commerce applications does not escape these dangers either. A consolidated list of codes reflecting individual codes related to Theme 5 is outlined in Table 5-8. The first level of data analysis in the three case examples highlights three major categories of problems in the utilisation of e-commerce. These include specific e-commerce problems (hardware and software), potential problems relating to the users of the systems and inherent problems of using the Internet and transaction with customers. These sources of problems are compounded by security issues, which can create further operational problems.

Table 5-8. Codes from Cases (X,E,R) associated with Theme 5

Core Codes	Associated Codes
EC Problems (X,E, R)	Security (X)
EC Clients (X)	
Internet (X,R)	

These potential problem areas were examined further using domain analysis to explore the sources of these problems and any possible relationships that may be evident between them.

Table 5-9. Theme 5: Domain Analysis Aggregate Worksheet (Cases X,E,R)

Factors that present problems for E-Commerce Utilisation			
Reference	**Included Terms**	**Semantic Relationship**	**Cover Terms**
X-T21	Critical mass of customers	*is a reason for*	EC Problems
X-T22	Clients don't have access to web	*is a reason for*	EC Problems
X-T22	Clients are too busy	*is a part of*	EC Problems
X-T22	Internet is too slow	*is a part of*	EC Problems
X-T25	Cost marketing products	*is a reason for*	EC Problems
X-T25	Cost of getting impact	*is a part of*	EC Problems
X-T33, E-T33, R-T44	Web development problems	*is a cause for*	EC Problems
X-T33	ISP's level of service	*is a cause for*	EC Problems
X-T30	Fraudulent transactions	*is a part of*	EC Problems
E-T32	No major problems	*is a part of*	EC Problems
E-T32, R-T44	Difficulty integrating existing system	*is a reason for*	EC Problems
E-T33	Existing system not an "Open" system	*is a reason for*	EC Problems
E-T33, R-T44	Integration into existing systems	*is a cause for*	EC Problems
E-T33	Critical mass of transactions required	*is a part of*	EC Problems
X-T11	Slow uptake of Internet	*is a characteristic of*	Internet
X-T11	Australia Internet adoption lags	*is a characteristic of*	Internet
X-T11	Internet is complex to use	*is a characteristic of*	Internet
R-T32	Staff abused use of Internet	*is a part of*	Internet
R-T32	Internet access not productive	*is a part of*	Internet
X-T26	Rely on word of mouth marketing	*is a way to*	Marketing
X-T30	Fraudulent activity	*is a part of*	EC Problems

The domain analysis of the three case examples suggests a range of e-commerce problems that arise during the design, implementation and deployment of the e-commerce application as well as problems that are indirectly associated with the business. The case examples report that the level of service provided by web developers and ISP's hosting the site, e-commerce clients and the Internet are potential problematic areas.

The problems highlighted by the case examples can be grouped into three broad categories; *Technical Problems*, the *Internet,* and issues relating to the *Client* use of e-commerce

- *Technical Problems*

Technical problems relating to the development of the web site were encountered by all three cases. In Case E and Case R the task to integrate the e-commerce application with existing IS systems proved challenging during the development phase. The level of service provided by the ISP was also a concern reported by Case X.

- *Internet Issues*

Management in Case X indicated that accessibility of the Internet for prospective clients was problematic and believed that the bandwidth currently supplied to average Internet users was too slow. Internal staff accessibility to the Internet was controlled in Case R as management found that access to the Internet was abused and work productivity decreased. As a consequence only specific employees were given access to the Internet.

- *Clients*

Accessing the desired client markets has been problematic for business X. The management acknowledges that the range of potential customers may not have access to the Internet and attracting a critical mass of customers that do have access is also problematic. Management from Case X suggests that the cost associated with on-line marketing is expensive and prohibitive. The other concern raised by Case X is the possibility of fraudulent transactions. Management addressed this by limiting the total amount of transactions possible with each connection.

5.7 Reflections

This chapter has illustrated the second stage of data analysis using a domain analysis technique. The chapter has explored the emergent codes identified in Chapter 4 for inherent characteristics and interrelationships displayed across the three case examples in relation to the research themes.

This chapter has outlined the development of the domain analysis aggregate worksheets to collectively explore the core codes in three case examples. The aggregate worksheets for the three case examples signify the characteristics and inter-relationships between and within each domain with respect to the research themes.

A review of the aggregate worksheets for three case examples highlights a range of relationships and interrelationships between the domains, which affect the use of e-commerce by SMEs.

Theme 1: The domain analyses of the three cases highlight the reason why SMEs use e-commerce is influenced by at least five key domains (Management, EC Driver, EC Strategy, EC Benefit and EC Client). The collective semantic meanings associated with each of each domain and the interrelationships that may be apparent within and between the domains influence the reasons for using e-commerce.

Theme 2: The domain analysis associated with how three case examples use e-commerce suggest that the Internet, Internet communications and the website are fundamental components used in the e-commerce applications. The domain analysis suggests that there exists a relationship between the e-commerce application, the potential benefits derived from the e-commerce activity and the clients using the e-commerce systems.

Theme 3: The domain analysis of the impact of e-commerce on the organisation suggests that SMEs can experience changes internal or external to the business.

The inter-relationship between the *Management, EC Application*, and the *IT Infrastructure* can induce internal changes to the business. External changes attributed to e-commerce may include the manner in which *Clients* interact with the business, the nature of the *Supply Chain* and the implementation of other e-commerce technologies.

Theme 4: A significant range of factors was found to contribute to the utilisation of e-commerce. The use of domain analysis to explore these factors in detail suggests that the factors can be categorised as internal factors that may be controlled by the business to a certain extent or external factors, which are often beyond the control of the SME. The internal factors identified in the three case examples are; the *Business Background, Management, EC Driver, EC Strategy, EC Application, EC Support, IT Infrastructure* and the business' *Website*. External factors contributing to the utilisation of e-commerce by SMEs can include; *EC Clients,* the *Internet,* the *Industry, Supply Chain* and *Strategic Alliances*.

Theme 5: The three cases used as examples in the combined data analysis approach did not signify any major factors that present problems for e-commerce utilisation. But the factors that were indicated related to technical problems during the design, development and implementation of the e-commerce systems, the inherent issues of the Internet and clients using the Internet.

In this chapter the domain analysis of three case examples are presented to illustrate the development of the aggregate worksheets. The domain analysis aggregate worksheets (See Section 3.4.5.1) provide a document that contains a rich insight into the semantic relationships within and between the domains. The consolidation of multiple cases in an aggregate worksheet provides a mechanism to explore the characteristics and semantic meanings of domains across all cases. The aggregate worksheet highlights emergent patterns and interrelationships relating to each research objective.

A discussion of the analysis for the three case examples has been presented in this chapter. In the next chapter the aggregate worksheets including all cases are interpreted and discussed to formulate the development of a set of new models and frameworks to explore the utilisation of e-commerce by SMEs.

6. INTERPRETATION & DISCUSSION

6.0 Introduction

This chapter provides an interpretation and discussion of the data analyses conducted in Chapter 4 and Chapter 5. The chapter reveals key insights into the use of e-commerce by SMEs the combined approach to qualitative data analysis culminating in the development of a *Four Phase Model of E-Commerce Utilisation and Business Transformation.* The Four Phase Model is the culmination of the interpretation of the data generated from the case studies. It is itself comprised of a series of models developed out of the data on SME e-commerce utilisation.

- The first section presents six key areas of e-commerce utilisation among SMEs. These include electronic banking, communications, cost reduction, sales and marketing, customer service and enhancement of business processes.
- The second section describes the strategic nature for the utilisation of e-commerce by SMEs. The level of sophistication of e-commerce use can be distinguished into two groups: experimental users of e-commerce and strategic users of e-commerce.
- The third section develops an *initial* four phase model of e-commerce utilisation among SMEs. The interpretation of the data suggests the utilisation of e-commerce by SMEs can be categorised into four phases: a static web presence, adjunct to conventional business, re-engineering of business processes and virtual business structures. The strategic orientation of e-commerce utilisation is observed in the model. The first two phases reflect an experimental approach to e-commerce direction while the last two phases are characterised by a strategic approach to e-commerce.
- The fourth section signals that the most significant e-commerce benefits can be achieved when businesses integrate e-commerce activities into existing business processes.
- The fifth section highlights the relationship between the degree of organisational transformation and potential e-commerce benefit derived from e-commerce utilisation. A four phase model of e-commerce business transformation is developed signifying the relationship between the degree of organisational transformation and the potential benefit derived from e-commerce.
- The sixth section describes a range of internal and external factors that influence the ability for SMEs to engage in business transformation and acquire benefit from the utilisation of e-commerce.
- The seventh section establishes the *Four Phase Model of E-Commerce Utilisation and Business transformation* by refining previous models developed in this chapter taking into account the influence of internal and external factors.
- The eighth section provides a discussion of the findings and models developed in this thesis compared and contrasted with the IS literature on SME e-commerce adoption and utilisation that has emerged since data collection. The chapter concludes with a summary reflection of the elements to emerge from this chapter.

6.1 The Utilisation of E-Commerce amongst SMEs

The analysis of the data suggests there is no associated link between the capacity of a SME to conduct e-commerce and the level of e-commerce actually implemented. Medium sized businesses included in this study that have greater access to capital and associated resources do not necessarily implement highly sophisticated e-commerce applications. In contrast some micro businesses with limited resources have developed complex e-commerce applications. The owners/managers of these businesses may lack access to capital and other primary resources but succeed in incorporating e-commerce into their businesses as a result of management enthusiasm and careful planning.

A preliminary review of the case studies located across the states of Western Australia and Tasmania revealed no noticeable differences in the utilisation of e-commerce. The utilisation of e-commerce in both States was similar. The e-commerce activities of SMEs located in Tasmania reflected those e-commerce initiatives of SMEs located in Western Australia in terms of how e-commerce is used.

6.1.1 How e-commerce is used

The business use of e-commerce in this study varies considerably. Section 5.3 provided an insight into how e-commerce is used among the three case examples. The analysis of all cases suggests the use of e-commerce can be distinguished into six broad groups. These include the implementation of e-commerce to utilise; electronic banking services, provide alternative communications systems, improve customer service, provide alternative sales and marketing functions, reduce costs and enhance existing business processes. In this interpretation all cases referred to are described in Appendix Four pp.249.

The case studies used a range of e-commerce products and applications. The range of the e-commerce applications used in their business is outlined in the Table 6-1.

Table 6-1. Summary of how e-commerce is used by SMEs included in this study

Electronic Banking • EFTPOS • EFT • Payroll • Bill Payment	**Sales & Marketing** • On-line store • Electronic marketing • Demonstrate products • Electronic Publishing
Communications • Email communications • Intranet • Extranet • Internet • Product transfer / electronic delivery • Electronic publishing • Quality Assurance • FTP	**Enhance Business Processes** • Customer relationship management • Alternative order entry systems • Customer reporting / enquires processes • Internet access to central databases • Improve quality assurance systems • Internal communications – Intranets • Franchise management
Customer Service • provision of alternative communications • customers able to self serve • Acquire feedback from end-consumers	**Reduced Costs** • Operational / Production Costs • Publishing Costs • Marketing / Demo Costs • Communication / Reporting Costs • Product / service Delivery • Free up resources

6.1.1.1 Electronic Banking

Electronic banking is one of the first e-commerce applications implemented by participating businesses. For some businesses the use of electronic banking may represent their only exposure to e-commerce. Electronic banking provides a convenient, timely and relatively secure way of transferring funds between one organisation and another. Businesses that have suppliers located overseas find that electronic funds transfer is a fast, convenient and secure way to transfer funds. The use of EFTPOS devices allows businesses to conveniently process credit card payments in-house. This technology provides the flexibility for virtual businesses to operate remotely and without the constraints of normal business hours. Businesses employing several staff can use electronic banking to streamline payroll functions. Payroll details are sent electronically to a financial institution to authorise the transfer of funds. The skills required to use electronic banking are minimal. The financial institutions will often install and support the technology that alleviates implementation and ongoing maintenance issues. The advantages of electronic banking are been increasingly recognised. The convenience, reliability and ease of use are essential attributes of an e-commerce application that achieved a high adoption rate. Examples of electronic banking applications found in the case studies include electronic payroll systems, EFT, EFTPOS, on-line banking and telephone banking.

6.1.1.2 Communication

The use of e-mail and other Internet based communication technologies are becoming wide spread. E-mail is used in a number of different roles. It can be used internally within an organisation and externally to disseminate information to numerous individuals quickly and effectively. Case S enhanced its communications extensively with the introduction of e-mail. This business operates twenty-four hours a day. The use of e-mail allows management to communicate with night shift staff and vice versa in a structured manner. E-mail

has reformed quality control and the consumer complaint system by channelling customer concerns directly to the production manger. Consumer complaints are resolved quickly enabling product quality to be maintained and controlled. Messages arrive to the appropriate people quickly and an audit trail of communications is available for reference.

E-mail is a flexible communication medium capable of providing benefits internal and externally to the organisation. The costs associated with using e-mail are far less than traditional phone and fax communications. The ability to attach other media items to e-mails makes this e-commerce technology a versatile, efficient and cost effective communications media.

The use of electronic forms also provides advantages to businesses that generate a large volume of communications with consumers and businesses along the supply chain. In Case S, the use of electronic forms revolutionised its conventional order entry system. Clients use electronic forms attached to e-mails providing an efficient and preferred form of data entry for their product orders. Electronic forms removed the manual task of data entry that was susceptible to human error. It streamlines the order system aligning key customer orders directly into back office information systems.

Electronic forms can also be used to structure information imputed through a web page. The information can be manipulated into a format ready for direct processing into back end information systems or be attached to e-mails for post processing. Case R has streamlined their data entry procedures significantly by accepting data via e-mail and their web pages. The use of electronic forms either as e-mail attachments or via web pages provides another efficient data entry system for SMEs.

Other forms of communications used by SMEs include Short Message Service (SMS) and Internet Chat (ICQ). Case S found the use of SMS to mobile phones located in delivery vans to be extremely beneficial. Text messages that were not urgent could be sent to delivery operators for minimal costs. The SMS messages were generated by the office and sent through the Internet. For urgent communications verbal advice using mobile phone communications are used. The use of ICQ provided an effective communication alternative for Case I that has business partners spread across three countries. The management readily use ICQ as simple, cheap communication medium to conduct international meetings. The ICQ Internet communications technology provides similar tele-conferencing functions at a fraction of the costs.

The advances in electronic communications technologies also make it possible to conduct operational management tasks remotely from branch offices. In the case of Case N head office is located in Sydney and remotely performs all the branch office accounting functions by downloading accounting data from each branch office. In another example, Case O operates numerous franchise outlets located around the State and remotely downloads daily sales information directly from each cash register located at the franchises for analysis. The business also provides all accounting functions for each of the franchises to maximise operational efficiencies.

Although the use of e-commerce communication technologies is gaining increased acceptance as a viable alternative for communications researchers are still finding that communications between businesses still relies on conventional face to face, phone and fax communication technologies (Hanaoka & Shimada, 2000).

6.1.1.3 Customer Service

Electronic commerce has the potential to dramatically improve the quality customer service for many SMEs. The SMEs in this study use e-commerce to support and foster sustainable customer relationships. E-commerce enhances customer service by improving accessibility, convenience and promoting value added services for the customer. The use of e-commerce to improve customer service formed a major driver for e-commerce adoption in several established medium sized enterprises (Cases E, Case R and Case S).

Analysis of the case studies suggests that e-commerce can improve the level of customer service in three ways. Firstly e-commerce provides a mechanism to communicate with end users directly. Secondly, e-commerce provides a feasible mechanism to deliver structured information to a large number of individuals or businesses. The third method to improve customer service by providing value added functions or incentives when individuals interact with the organisation. These services are aimed at maintaining customer loyalty and convenience. This research highlights three instances where customer service is improved as a direct result of incorporating e-commerce.

- Provision for Direct Feedback;
- Information Dissemination;
- Customer Retention

Direct Feedback:

The ability for businesses to communicate directly with end users of products and services greatly enhances the level of customer services offered by businesses. Electronic commerce enables businesses to bypass traditional communication linkages by providing a mechanism for direct contact between primary producers or manufacturers and the end user. This can greatly enhance quality assurance, product testing and marketing. In Case S the feedback to the organisation provides a valuable method to maintain quality control of it's products and adjust processes or product lines that best suit the customer's demands and desires. The organisation also has the chance to test new product lines and implement changes to current product mixes. The opportunity for customers to address product queries or problems directly with suppliers means faster resolution times and happier customers.

The chance to by-pass many of the elements along a traditional supply chain enabled primary producers like Case A and Case G to offer expert advice to end consumers of the products. Traditionally Case G they would sell their plants to a wholesale nursery which then on-sells the plant to the public. Normally the business would not have contact with the end users however e-commerce provides a mechanism to offer expert advice directly to the end consumer for relatively

little costs. This specialist knowledge would not normally be available to the consumer in a conventional transaction process.

Information Dissemination
E-commerce can significantly improve the level of service delivery for those businesses that are in the business of providing information. Information products are highly conducive to e-commerce transactions due to their flexibility and portability.

Case R and Case AE are examples of information providers, which have identified the benefits of using e-commerce to deliver and acquire information. The use of e-commerce has transformed the level of customer service for Case R. The costs of acquiring, manipulating and reporting information to customers are significantly reduced. The level of e-commerce activity continues to grow as clients recognise the convenience, timeliness and accessibility of acquiring information via the e-commerce system. Within a year of implementing the e-commerce system the company had over 1100 website users and processed an estimated 50,000 e-mails.

Case AE provides agricultural information to farmers located all over Australia. The interest by farmers using the e-commerce system is growing but not at the same rate as in Case R. The initial reluctance by management to support the e-commerce initiative and the poor communication infrastructure to rural Australia has presented barriers to the potential growth in e-commerce. However management are realising the benefits accrued from e-commerce and as the IT infrastructure in rural Australia improves the e-commerce business case for Case AE will be stronger.

E-commerce can be used as a sophisticated alternative to present information about products, services, and order and delivery details. SMEs can use e-commerce to improve customer service by providing a mechanism where information can be accessed and delivered in an efficient, timely, convenient low cost manner. Customers can use e-mail to contact the SME directly or search the organisation's website for specific information. In more sophisticated cases customers can query the organisational database directly for an immediate reply. Such a response rate surpasses conventional phone and fax queries. Customer service is improved by alleviating valuable resources such as time, capital and human resources. Customers can search for solutions and answers quickly with minimal fuss. These systems are highly suited towards those businesses that process larges quantities of information regularly or primarily trade in information related products. The most benefits can be attained when businesses integrate these customer information systems directly into existing backend systems providing live information. However issues of security and levels of accessibility need to be addressed.

Customer Retention
The potential threat of disintermediation by suppliers prompted Case E to offer an innovative approach to trading with its major customers. The e-commerce application streamlined customer inquiries enabling clients to access key

information about products, order status, and stock availability 24 hours a day at their convenience. To increase client rapport and loyalty, the e-commerce system was also designed to facilitate an extra business tool tailored to meet the needs of corporate clients. The e-commerce application provided a value-added service by enabling corporate customers to monitor their staff orders and spending habits. This valued added service is aimed at enticing existing clients to maintain trading relationships with the organisation.

The implementation of an e-commerce system in Case R significantly enhances the traditional transaction processes between the organisation and clients. The ability for customers to input current information and receive live reports has resulted in an improved reporting service. Clients have the convenience of accessing information whenever they want it and the information is current at the time it is accessed. The business benefits by reducing the need for data manipulation and formatting. The costs of providing services to the e-commerce clients are greatly reduced while still maintaining a high level of customer service.

In both these cases the customer's opinions were gathered as part of the design and development of the e-commerce applications. This helped ensure a win-win situation for the organisation and the customer.

6.1.1.4 Sales and Marketing

The analysis of the data suggests that a popular use of e-commerce by SMEs is to incorporate an on-line sale and marketing service. SMEs involved with selling products and services to the public consider e-commerce as an opportunity to increase direct and indirect revenue. The potential to derive increased sales from the on-line market is an attractive business proposition for many SMEs.

This research found that some SMEs formed a strategic approach to their on-line sales, aiming to utilise on-line revenue streams as a core part of their total income. Alternatively, other SMEs approached Internet sales in an ad-hoc experimental manner. These SMEs used e-commerce in an experimental mode, where on-line sales were not considered to be an essential part of their core revenue stream initially. The attraction of a global on-line marketplace was a major driver for SMEs to establish new customer markets and sales at a relatively low cost.

The Internet provides a beneficial environment to sell and market information based products. Digitally formatted information is ideally suited for e-commerce as these products are easily transferred and stored, delivery costs are minimal and accessibility can be provided 24 hours a day. Several SMEs included in the study have established on-line stores selling both information and physical products and services. Cases that traded exclusively in information based products included Cases 'B', 'D', 'R' and 'X' and 'AE'. These businesses have the added advantage of potentially being upwardly mobile and capable of operating from any remote location with access to the Internet. SMEs that possess these virtual characteristics are discussed in greater depth in section 6.2.3. Businesses considered to be virtual enterprises include (Case B, Case D, Case G, Case U, Case X, Case AH). Potential virtual businesses include Case R and Case AE.

E-commerce provides an opportunity for established businesses, trading in physical products, to enter new markets and increase revenue. Although the trade in physical products is not as well suited as information products for e-commerce, several SMEs successfully sell or take on-line orders for physical products.

The combination of e-commerce applications and conventional trading mechanisms provide alternative methods for individuals to interact with SMEs. The level of potential benefits derived from e-commerce depends on the different degrees of e-commerce functionality provided by SMEs. While a large proportion of SMEs in this study were using e-commerce for sales and marketing purposes, the level of e-commerce sophistication varied considerably. Some SMEs provided static web pages with product information and basic ordering facilities with little or no security. At the advanced end, SMEs were providing sophisticated secure order entry systems with direct links into organisational databases for automated processing.

From a consumer perspective on-line sales applications can provide a range of benefits. Increased levels of convenience and accessibility are available and the ability to search and order products can be conducted 24 hours a day, 7 days a week. The convenience of ordering products and receiving products to your doorstep within 24 hours is an attractive proposition for many individuals.

> I had an email from a lady in Sydney. She ordered some children's party wear on-line and she said her order had been terrific because she worked in some commercial place and her home was too far away for delivery. She said lunchtime was too busy to get out on the road. She saw our site ordered the gear and delivered to her the next day at her work. She was most impressed. (Case AI located in Western Australia)

This level of convenience is hard to simulate using conventional trading approaches. The Internet can provide access to a range of possible vendors at a local, national and international level.

E-commerce provides an incentive for some SMEs to disintermediate part of the supply chain. The opportunity to bypass parts of the value chain enables businesses to potentially gain higher sales income for products then may otherwise be achieved. A major driver for e-commerce for Case G, a fruit tree grower was to acquire increased sales income for less volume of product sold by disintermediating the wholesale and retail nurseries from the supply chain. By using e-commerce to bypass the traditional wholesale retail value chains the business was seeking to increase sales margin for each product sold. The global reach of the Internet increases the market opportunity for their product and the chance of corresponding with individual purchasers meant that valuable expert after sales advice could be offered. For this business the use of e-commerce has provided a win-win situation for both the organisation and the customer.

The ability to gain direct feedback from customers is an added advantage of trading on-line. The feedback from potential or existing customers provides the ability for businesses to adjust existing products to better suit demand. Case B actively seeks the opinions of potential clients to customise the product for their

needs. Case S directs customer feedback back into the manufacturing process to minimise problems in the future. On-line bookshops Case AH and Case AJ gather information from customers to create customer profiles that personalise future communications and the potential for customised marketing strategies for similar groups of existing customers.

The study revealed several potential problems inherent in using an on-line sales strategy. Issues of authentication are problematic for businesses that communicate directly with the public using e-mail or electronic forms. The potential for Internet fraud rates as an important issue amongst SMEs selling products and services on-line.

> It leaves us in a very vulnerable state. And for that reason we are very, very wary. We do make certain checks. We do have certain danger signals and when we see possible danger signals. Then we will switch to unfriendly mode and request for proof of card and authorisation. It is a major issue for us. We have been caught several times by con artists. Who have been very clever about the way they go about it. We have become more sophisticated about it but every once and a while some one will get past us.

On-line bookshop (Case AH) has incurred financial loss as a result of fraudulent Internet transactions and has taken steps to minimise this problematic area.

6.1.1.5 Enhanced Business Processes

Significant benefits can be achieved from e-commerce by integrating e-commerce functions directly into conventional business processes particularly for businesses that are trading in information based products.

In Case AC, Case AK, Case Z and Case E, e-commerce is used to streamline orders, and inventory control. The use of e-commerce allows resellers and corporate customers to interact directly and unassisted with the distributor's inventory systems. The e-commerce system reduces the number of product queries and fast tracks the ordering process.

Internet Service Providers (ISPs), Cases AD and Case W provide a range of e-commerce services. Their production, testing and delivery of e-commerce systems are conducted totally on-line. Their business not only develops and supports e-commerce systems of other businesses but also relies on the Internet for their livelihood.

Case R and Case X have used e-commerce extensively to restructure their customer reporting functions. In the past reports were only available to customers via the traditional print medium. Registered customers now have the opportunity to access customised reports at a time that is convenient to them. The new system provided better quality information that is convenient and timely. The organisation benefits by providing a better quality product with reduced publishing and delivery costs.

These e-commerce applications have enhanced the business processes by streamlining the handling of customer queries. This system alleviates the need to

spend time with customers on the phone and fax. Customer service is improved and the organisation can spend resources elsewhere within the organisation.

Case O, relies heavily on the e-commerce system to control their franchise system. Information is pooled daily from each franchise for analysis. Based on the information collated from each franchisee, strategic direction regarding marketing, product range and business viability can be discussed. This dynamic approach to monitoring the franchises is based on an elaborate e-commerce system. The information reporting and financial systems rely totally on the e-commerce infrastructure. Without e-commerce this organisation could not work as efficiently as is currently possible.

Case S has streamlined its order entry and customer information systems with the aid of e-commerce applications. Product orders are attached to e-mails as electronic forms, which are integrated directly into back office information systems. Past problems of manual entry errors are significantly reduced and the speed of order entry is increased. The establishment of an Intranet has created numerous benefits and communications between night shift workers and management is greatly improved. Customer queries and problems are automatically directed to the appropriate personnel and potential changes to the production system can be incorporated quickly.

All messages are sent via e-mail, which can be addressed 24 hours a day 7 days a week. The antiquated system of leaving paper notes for staff created many problems especially when notes were lost or given to the wrong people.

6.1.1.6 Reduced Operational Costs

It is difficult to measure all the potential benefits that can be accrued from e-commerce by SME however the analysis of the data indicates that e-commerce can potentially reduce costs in several key areas:

- communications,
- publishing,
- marketing,
- product demonstrations,
- production costs, lower overheads,
- supply chain costs,
- product delivery and time saving.

A common cost saving for the cases was a reduction in communication costs both internal and external to the business. The use of Intranets (Case S, Case O) and email ensured cost saving internal to the business. The use of email, electronic forms attached to emails (Case S) and web forms (Case F, Case J, Case T, Case Y, Case AA, Case AH, Case AI, Case AJ) provided alternative modes of cost effective communications with external clients, and trading partners. Cost savings for external communications, utilising e-commerce technologies, are particularly effective when these individuals are located interstate or internationally. The ability to send marketing and sales information to multiple recipients simultaneously is advantageous, saving time, conventional publishing costs and delivery costs.

The ability for a business to disintermediate components of a supply chain and transact directly with end consumers provides an avenue to reduce the costs of agent fees/commission along the value chain. Potential cost savings are significant and may be a primary driver for e-commerce if the business is the manufacturer of the product (Case A, Case G, Case J, Case X and Case V).

The use of e-commerce was well suited for businesses that are involved in the distribution and sale of information or electronic products (Case I, Case V, Case AE, Case X, Case AD). Cost savings in terms of marketing, communication and publishing were all apparent. However the cost savings associated with product delivery (Case AE), product demonstration (Case B, Case D, Case X) and lower production costs (Case H, Case L, Case R, Case X, Case W, Case Z, Case AD, Case AE, Case AK, Case AG) are extra benefits potentially available due to the nature of the product.

6.2 Two approaches to SMEs E-Commerce

In the previous section it was noted that the use of e-commerce by SMEs included in this study could be described by six categories.

- Electronic Banking
- Communications
- Customer Service
- Sales and Marketing
- Enhanced Business Processes
- Reduced Costs

It is apparent from analysis of the data that there exist different degrees of e-commerce sophistication demonstrated within each of these groups. One way of distinguishing the level of sophistication within each group is to examine the intent with which e-commerce is applied within the businesses. A closer examination of the aims of the organisation using e-commerce suggests either a strategic or experimental approach. A discussion of each of these approaches to e-commerce follows.

6.2.1 Experimental Use of E-Commerce

The analysis of the data suggests businesses that take an experimental approach to e-commerce do not display the significant organisational transformation attributed to the strategic introduction of e-commerce.

The experimental use of e-commerce can be broadly classified into two groups. One group of SMEs embrace e-commerce with minimal resources allocated. These SMEs use e-commerce primarily to gain a Internet presence often with a static website. These businesses use the Internet to publish organisational information, contact details and information about products or services offered. These types of websites are unlikely to change and resemble electronic brochures.

The second group of experimental e-commerce SMEs use e-commerce as an alternative communication and trading mechanism with prospective customers, suppliers or business associates. These businesses are prepared to allocate more

capital expenditure to e-commerce to provide alternative trading systems or communication mediums. However these e-commerce initiatives are not fully integrated into existing information systems. The experimental e-commerce systems involving on-line orders and sales are typically re-entered manually into existing transaction systems. The potential efficiencies from e-commerce are significantly reduced when an experimental perspective is taken. However the costs associated with adding limited e-commerce to the business are less than an elaborate fully integrated e-commerce system.

Analysis of the case studies suggests that fourteen SMEs included in this study are representative of SMEs that view their use of e-commerce to be experimental in nature. Micro, small, medium enterprises were all representative of the experimental use of e-commerce. Even though many of these businesses possessed the managerial, financial and technical resources to implement more sophisticated e-commerce installations many choose still to take an experimental approach.

The SMEs aligned to an experimental approach for e-commerce did not consider the use of e-commerce as an important component of their business. Consequently the only small amounts of resources such as time, finance and urgency was allocated to e-commerce initiatives. In some cases friends and family created the web based e-commerce applications such as websites. The study identified these sites as either static in nature or low in functionality. The sites offer product and organisational material with little functionality. For some of the businesses involved with retail sales the use of their websites may include on-line sales components or shopping carts to supplement existing sales systems. These systems offered low levels of security and displayed an amateur presentation.

The experimental users of e-commerce do not consider e-commerce to be strategically important to the business. These SMEs experiment with e-commerce to gain some experience and knowledge to determine what contribution it can make to the organisation. Cases I and Case K state that they did not expect returns on their investment in the short term. The capital outlay to establish their e-commerce applications was minimal and the amount of resources required to implement and support e-commerce was relatively low. In Cases 'B', 'C', 'J', 'K' the websites were created by the business owner or family friends. In some instances, these SMEs have not computerised their offices and continue to use a home computer to develop and maintain their web strategy. After experimenting with the e-commerce technologies if the businesses can envisage a potential benefit derived from e-commerce, they may decide to commit more resources to develop a more strategic perspective for the use of e-commerce.

6.2.2 The Strategic Use of E-Commerce

While Hall (1995) indicates that formal strategic planning is not a widespread phenomenon within SMEs, the strategic use of e-commerce was noted in twenty cases included in this study. The strategic use of e-commerce by SMEs may be explicit in some cases but frequently it is implicitly implied. The term strategic is defined as "*Important or essential in relation to a plan of action*" or "*Highly important to an intended objective*" (www.dictionary.com). These definitions are both pertinent to how the term strategic is discussed in this study. In this study the

strategic use of e-commerce includes those businesses that have significantly altered existing business processes to incorporate e-commerce as a significant component of their business. The strategic use of e-commerce also includes those businesses that depend on e-commerce as part of the daily business practice. Without the use of e-commerce these businesses would be severely disadvantaged. In this study the strategic use of e-commerce can be categorised into six groups. These can be described as; *order entry systems*, *product delivery*, *quality control*, *communication*, *product development* and *on-line sales systems*.

The strategic use of e-commerce by SMEs can be further distinguished by those businesses that have transformed their business processes or organisational structure to acquire the greatest benefit possible from e-commerce. Two strategic categories emerge from the data.

Strategic Use of E-Commerce: Category 1

The first category consists of established businesses that can identify potential benefits from e-commerce and adjust or transform business processes to integrate e-commerce functionality into existing workflows. The potential benefits derived from the strategic use of e-commerce facilitates:

- enhanced customer services,
- reduced transaction costs,
- increased business efficiencies,
- improved operational flexibility,
- obtaining competitive advantages and
- Improved product and service delivery.

The businesses exhibiting a high degree of strategic utilisation of e-commerce consider e-commerce to be an essential component of their business operations. It is used to enhance customer service by providing alternative ways to communicate with customers. E-commerce facilitates lower transaction costs by reducing communication, publishing, marketing, delivery and production costs and provide other operational efficiencies unobtainable in the past, where individuals can self serve themselves for product/service information and other general inquiries. The capital and resource outlay has been extensive however management believes that costs associated with aligning e-commerce strategies with core business strategies will enable them to be more competitive in associated marketplaces. The development of new systems incorporating e-commerce makes it more difficult for competitors to react and assimilate. E-Commerce is used to enhance supply chain management and customer information systems by streamlining procurement processes and customer relationship models. Business efficiencies can be generated with business to business transactions through superior on-line communication technologies and business to consumer transactions are improved by the ability to deliver products and services to consumers in a timely, convenient and cost effective manner.

Table 6-2. Summary of Cases using e-commerce strategically

Strategic Use of E-Commerce	Examples
Enhance customer service	Cases E, AE,R, X
Reduce transaction costs	Cases I,K,O,R,S,AC
Provide operational efficiencies	Cases E,R,K,O,S,AE
Operational Flexibility (eg. virtual structure)	Cases B, G, X, Y, AH
Acquire competitive advantage	Cases E, B, Z, AD
Enhance supply chain management	Cases S, AC
Product / service delivery	Cases B,G, R AE

Strategic Use of E-Commerce: Category 2

A second category of strategic users are SMEs that are fully dependent on the use of e-commerce to conduct business. E-commerce is a major component to their business proposition. These SMEs use e-commerce to disintermediate their traditional supply chain linkages. Their target market includes clients nationally and internationally and businesses included in this category can exhibit different degrees of virtual-ness. The virtual business model is an attractive business model for businesses that wish to minimise operation costs yet have the potential to access to a global market.

Established businesses may find that a substantial portion of their market place is derived or accessed from the on-line market. Consequently they may consider two avenues; a total consolidation of business activities and transformation from a "bricks and clicks" company to a "clicks" only business, or choose to start up an independent business solely catering for the on-line community. This was the case for Case G and Case X. In these cases the owners decided to establish separate business entities to explore the possibilities of targeting on-line customers exclusively. The use of strategic alliances may also give rise to this state however as previous research has highlighted this is not a key determining factor in virtual small business (Chau & Turner, 2001). The notion of virtual enterprises is explored in section 6.2.3.

6.2.2.1 Facets of the Strategic Use of E-commerce

Analysis of the SMEs included in this study highlighted seven key areas where e-commerce is used strategically. These included the strategic use of e-commerce in data entry systems, product and service delivery, maintaining quality control, communications, acquiring competitive advantage and attracting on-line sales.

6.2.2.1.1 Data entry system

The use of e-commerce for data entry can provide many benefits. E-commerce enables businesses to undertake data entry at the point of contact with customers or other trading associates. Businesses and individuals communicating with the SME can be enticed to enter information directly into an e-commerce application where the data can be further manipulated for processing without the need for the manual re-entering of information into existing information systems. Three SMEs (Case E, Case R, Case S) included in this research actively utilise e-commerce to streamline their order entry systems. These businesses identified numerous benefits from e-commerce by getting customers to directly enter information into the organisation's e-commerce system electronically linked to backend

information systems. The methods differ from those businesses that take an experimental approach to using e-commerce. The "experimental" businesses are unlikely to integrate e-commerce activities with their established systems because of security concerns, costs of integration and resources to manage such integration. The manual process of re-entering orders received on-line into back end systems has the potential to create errors and equates to more work. As a consequence for experimental businesses the potential for benefits derived from e-commerce are restricted and are significantly reduced when compared to businesses that strategically align e-commerce order entry systems with backend systems.

6.2.2.1.2 Product/Service delivery

E-commerce presents some major advantages for those businesses that deal primarily in information based products. The supply and delivery of the product can benefit immensely from the use of e-commerce. Strategically e-commerce is highly conducive to using e-commerce to deliver information based products. If the product can retain its appeal in an electronic format, e-commerce can provide a system of delivery that is fast, convenient and accessible. Several SMEs (Case AE, Case R and Case X) have developed e-commerce systems that facilitate the delivery of their product. The potential benefits that e-commerce can provide are two-fold. From the customers perspective the e-commerce application can provide products and services 24 hours a day, 7 days a week in a customised highly personalised format. From the perspective of SMEs the implementation of e-commerce brings a number of benefits. Resources previously used to coordinate product packaging and delivery can be allocated elsewhere in the organisation. The costs of product transportation are consolidated so that the delivery of an electronic product locally equates to similar costs of delivering the product to the other side of the globe. These benefits highlight the strategic approach to electronic delivery systems integrating directly into backend database systems.

6.2.2.1.3 Quality control

The ability to extend an Intranet system to incorporate feedback from suppliers and customers can significantly enhance the quality control systems available in SMEs. In Case S e-commerce is used to report problems identified by customers. Customer feedback is entered directly into the Intranet when it is received over the phone or fax. The flow of information is automatically directed to the appropriate staff via e-mail, which ensures that problems are quickly dealt with before they escalate. The use of e-mail to handle customer feedback also provides an audit tool for management to track customer complaints and remarks. The strategic use of communications linked directly into the heart of this organisation's production line means that quality control, customer service and the ability to monitor market demand is assured.

6.2.2.1.4 Communications

SMEs have gained significant benefits from the establishment of Intranets and Extranets. The use of Extranet and Intranets to consolidate communications within SMEs and in distributed organisational structures can yield efficient support and information structures. The utilisation of organisation wide e-mail systems can generate significant organisational efficiencies. This is particularly apparent when the organisation is geographically spread across the state,

nationally or internationally. The benefits of electronic communications have been discussed in section 6.1.1.2. The strategic use of e-mail has brought significant benefits for at least four cases included in this study (Case I, Case K, Case R, Case S). These businesses rely heavily on e-mail communications to communicate with core clients so e-mail is integral to the daily operations of the business. Without access to e-mail the operations of the business would be disadvantaged.

6.2.2.1.5 Competitive Advantage

The strategic use of e-commerce to specifically gain some competitive advantage over competitors proved a major incentive for some SMEs in this study (Case E and Case B). E-commerce can provide SMEs with a competitive advantage in a number of ways. Flexible trading mechanisms, remote management operations, experience gained from taking a hands on approach to e-commerce, first mover advantage, and international economics all contribute to different facets of competitive advantage reported by SMEs in this study.

Management in Case E considers that their use of e-commerce will provide a competitive advantage by providing a system that promotes trading flexibility and value added services enticing major customers to remain loyal to the company.

The ability to manage franchise operations remotely using e-commerce technologies ensures that Case O maintains control over its franchise system providing essential support services without having to be on site. E-commerce is used as a strategic business tool that facilitates the franchise operation and prohibits the chance of new entrants entering the market place. The reduction in costs and business efficiencies brought about by e-commerce allows Case O to retain the position of market leader in a highly competitive industry.

The services provided by Case R are an array of financial services that are difficult to match by competitors both locally and nationally. The strategic use of e-commerce to provide these services via a website affords accessibility, convenience and a reduction in production costs to ensure a higher level of competitive advantage and the ability to remain market leader. In Case S the use of e-commerce has streamlined their order entry process and quality control mechanisms to assure their business retains market leader position. The owners of Case AI suggest that innovative management initiatives can reap competitive advantages. The experienced gained from taking an active role developing e-commerce applications is advantageous.

> To a certain extent it is important to experience it yourself first hand even if you were to take an outside consultants view. Very often as they are not involved with the day to day running of the business there are aspects that they don't hear or see of (Case AI).

Established businesses, particularly large businesses with a well known brand name, find it considerably easier to attract users to an e-commerce initiative than SMEs with little business exposure. Case AH propose it is important to establish an Internet presence sooner rather than later before other competitors enter the market place.

> If you are small and can't get news coverage and can't promote yourself through established channels the only way to establish yourself is to build up a customer base which does take a while. (Case AH).

Businesses like Case AH actively seek a degree of competitive advantage by establishing themselves and attracting potential customers before other competitors do so. In another business (Case AJ) also believes that there is a first mover advantage by using e-commerce. Management believes that "The biggest advantage is going through the learning curve". The owners are happy to have experienced the process of incorporating e-commerce into their workplace but have found the experience to be costly and requiring a large amount of support.

E-commerce is an essential tool for those businesses trading in the information age. Web developers, Internet Service Providers rely on the Internet as a development, marketing and sales platform. The use of the Internet and e-commerce technologies are central to the core activities of these businesses. Without the Internet these businesses would not exist so the strategic use of e-commerce is implicit. These businesses operate in a highly competitive environment where the level of competition is not confined only to local areas but can include the international arena as well. Fortunately for many Australian web developers the ability to secure international work is not difficult as a result of lower overheads and competitive rates. Australian businesses providing e-commerce skills and expertise are price competitive compared to competitors in North America and Europe. Web developers (Case Z and Case AD) located in Western Australia gained a competitive advantage over their eastern seaboard competitors with lower operating costs while maintaining similar product quality and service with the aid of e-commerce technologies. The costs of operating their business are significantly reduced in Tasmania and Western Australia compared with other competitors resident in the eastern seaboard capital cities.

6.2.2.1.6 On-line sales

The lure of the global Internet market is a primary strategic driver for the use of e-commerce for several SMEs in this study (Case B, Case G, Case V, Case AH). Businesses transacting in information based products can gain significant rewards as previously discussed in Section 6.1.1.6. Other additional benefits that can be reaped include reduced marketing costs and accessibility to global consumer markets. Traditionally, marketing to a world market is an expensive and complex task. However with the aid of e-commerce the ability to access a world audience is within the reach of SMEs. Case D a software distributor is an example of an SME that has successfully sold and supported a product with clients predominantly located in the Asia Pacific region. E-commerce minimised the costs of communication and marketing so that it was a feasible proposition to trade the product at either a national or international level. The electronic nature of their product enabled e-commerce to facilitate a profitable medium to trade this product.

The ability to identify and market directly to a niche market is an added advantage to trading on-line. Case AH started off as a generalist book store but quickly discovered that on-line sales were attributed to customers looking for specific literary areas. The Internet provides an opportunity for this SME to market to a

specific niche area of their industry. With out the international interest in this niche market the SME would not survived marketing just to the local or national market alone as they would not provide sufficient returns.

The utilisation of e-commerce to disintermediate traditional supply chains structures also provides a strategic incentive for some businesses. Case G and Case V are two primary producers that identified opportunities to by pass traditional supply chains and market their products directly to the public. For Case G the potential return on each sale of their product justified their strategic decision for an on-line sales outlet based from the farm. Although lower sales volumes are envisaged and their sale price would be below retail prices the increased margin on sales was still significantly higher than when selling their product to the conventional wholesale nursery.

6.2.2.1.7 Strategic Alliances

The use of strategic alliances was not a major driver to use e-commerce reported by SMEs in this study. However other researchers such as Poon (1996a) suggested that the potential benefits derived from forming strategic alliances are significant amongst cases studies included in his study. Nevertheless, it was common for SMEs involved in website development to instigate formal or informal alliances with businesses offering complementary skills and services. This provided the SMEs with a greater variety of products and services to supplement core services provided to clients. Businesses that operated solely via the Internet also attracted the attention of other businesses wishing to cross sell their products on the website. This was experienced by Cases X and Case D. Although these SMEs did not consider these alliances appropriate they acknowledge that marketing complementary products, might enhance the existing businesses products or services. Case X did not explore the chance of forming alliances as management wished to maintain quality control over their Internet presence and products. Case D reported that after developing a web presence, other businesses approached Case D to act as an agent or distributor for that product. In each case this phenomenon was unexpected, as these businesses did not actively seek collaborative interests as part of their web-based strategies.

6.2.3 The Virtual Small Business

There is a lack of literature specifically addressing the issue of virtual-ness in small business. While there exists a multitude of purported benefits available to small businesses that embrace elements of going virtual there remains a significant lack of real-world models of virtual organising in the small business sector (Barnatt, 1997). This study explored the concept of virtual-ness in small business. At a conceptual level the research illustrates that the over-emphasis on collaboration in the analysis of virtual organisations is problematic for virtual small business (VSB). The analysis of the data found that web-based small businesses already exhibit a high degree of virtual-ness but do not necessarily engage in virtual collaborations, formal alliances or partnerships. The VSBs that were identified in this study reflect a new and distinct sub-set of the broader virtual organisation concept.

Previous Australian research that has explored the topic of virtual organisations in the small business context has defined virtual small business as 'a set of flexible

and short-term multi-partner relationships among independent economic agents spanning multiple time zones and wide geographical locations; and mediated by networked information and communication technologies' (Tetteh, 1999:6). Similarly, in a European context VSBs have been defined as 'dynamic multi-enterprise collaborative structures specifically designed to increase creativeness and competitiveness in delivering innovative global products by bringing their core competencies within a value adding chain in a network of enterprises' (CEC 1999).

This emphasis on collaboration as a characteristic of the virtual organisation was initially developed from research with large businesses. Whilst web-based collaboration amongst small business may be appropriate for certain VSBs it is important to highlight that web-based collaborative efforts of large and small businesses are significantly different. However, some researchers have made the argument that collaboration can be viewed as an evolutionary pattern for small business. To date, this has yet to be explored in the context of VSB (Johannisson & Dandridge, 1996).

In this context, it is also important to highlight that the focus on collaboration between businesses as a determinant of virtual-ness amongst VSBs has led researchers to ignore other emerging VSB forms. These new forms, whilst not collaborative in their web-based business operations, have numerous virtual business attributes including no physical commercial address, temporal and spatial independence and global reach.

In the light of the above points it is relevant to highlight that organisational theorists have recognised for a long time that small businesses are not the same as large business (Dandridge, 1979). Aside from obvious distinctions based on size, turnover and resources, small businesses have traditionally exhibited adaptability, innovation and agility. These are the very attributes that large businesses have strived to obtain by formulating virtual organisations or by engaging in web-based commerce (Poon & Swatman, 1998). This suggests that small businesses are well positioned to harness major productivity gains from the global arena by exploiting their ability to be flexible, dynamic and agile in the new web base economy (Kaplan *et al.*, 1997).

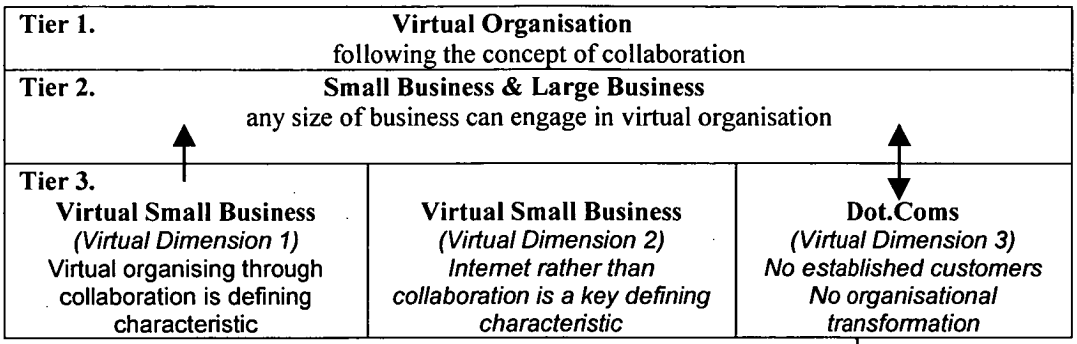

Figure 6-1. Conceptual Framework of Virtual Small Businesses[1]

Figure 6-1 presents a conceptual framework that enables a discussion of the different types of virtual-ness exhibited by small business. The literature suggests that virtual organisations consist of small and large organisations that engage in extensive networks that can transcend organisational and geographical boundaries **(Tier 2)** (Tetteh & Burns, 1999). This also includes organisations that amalgamate their core expertise into a joint venture to formulate a flexible organisational structure **(Tier 1)** (Barnatt, 1997; Dewey & Bolton, 1999). In Tier 3 the research proposes three *Virtual Dimensions* to distinguish small businesses exhibiting various degrees of virtual-ness. *Virtual Dimension 1* (VD1) includes those small business engaged in virtual organising which are reliant on collaborative links to facilitate the coordination of essential business processes (same as small businesses in Tier 2).

The VSBs of the second *Virtual Dimension 2* (VD2) in Figure 6-1, represent small businesses with an existing value proposition and an established client base that have undergone substantial e-business transformation to acquire organisational flexibility and other benefits derived from virtual organising. These small businesses may, or may not be involved in collaborations or trading relationships. Significantly it is these VSBs use of e-commerce technologies and engagement in e-business transformations that defines their virtual-ness rather than whether they are engaged in collaborations. In some cases VSB located in VD2 represent new business ventures conceived from well-established businesses that want to create separate on-line trading entity (Case X and Case B). The use of e-commerce is an integral part of these business operations however the use of strategic alliances and collaboration is not an essential part of their business case.

Virtual Dimension 3 (VD3) in Figure 6-1 acknowledges "Dot.com" businesses that trade entirely on the Internet. Typically they have no established customer bases and do not necessarily rely on trading partnerships or forms of collaboration to conduct their business. The businesses undergo no organisational transformation to trade effectively on-line. These businesses have no established business case and are created with the sole purpose of trading purely on-line.

[1] The author has published a preliminary version of conceptual framework of virtual small business. Chau S.B. and Turner P. (2002) "A Conceptual Approach to Virtual-ness in Small Business Electronic Commerce: Four Australian Case Studies." *in Proceedings of the 13th Australasian Conference on Information Systems*, Melbourne, Australia December 2002.

The next section of this paper provides detailed insight into six small business case studies that have included elements of virtual organising into their business strategy. The analysis of the case studies aims to identify various attributes of operating in a virtual manner.

6.2.3.1 Virtual Small Business Case Examples

Case N

Case N represents a small business that coordinates the storage, sale and acquistion of esssential oils derived from natural plants grown by selected farmers around the State. The business is a joint venture between the farmers and the firm which carries out the sales and marketing of the essential oils. There are currently four people employed in the business that maintains the operations of the business. The organisation retains close communications with a parent organisation located in Sydney. An electronic link via modem connects the organisation with Sydney. Phone and fax machines are used to co-ordinate the collaboration with farmers to monitor and control supply of stock. These collaborative links are essential to the operation of the business. The organisation is reliant on the farmers to harvest and deliver the plants for further processing. The business then refines and packages the essential oils for sale to the world. The small business uses its web page as an alternative method to market its products internationally generating inquiries and orders via e-mail. Product information and quotations are generally faxed back to the prospective customers.

Case B

This business has created highly specialised scientific software to interpret ocean data from sophisticated echo sounders used on research vessels. The software interprets the raw data and manipulates the information into a representation of ocean plots of fish density and population. Through the use of e-commerce technologies this small business has been able to transfer various business functions to a web site. This business uses the web extensively to demonstrate the product and to facilitate a communication gateway with current and prospective users and business partners. The web has facilitated the virtual nature of this business, which is not bound by geographical boundaries or time zones. Information about the product is available 24hrs a day. The web-site provides, existing and new customers information concerning the product, product support, demonstrations and the ability to download software upgrades at their convenience.

The ability to use e-commerce to consolidate several business functions has enabled the business to free up valuable resources, which can be used in other areas for product development and improved customer service. All aspects of this business exhibit virtual-ness. The product is dynamic and easily managed electronically. The business operation is not bound by any temporal or geographical limitations.

Case AH

This business operates from the rear of a house in Perth, Australia. A husband and wife team established the business six years ago. Initially this on-line bookshop catered for a wide range of subject areas however in recent years the business has found selling books in niche areas to be more profitable. Geographically the

customer base is global with business' sales distributed evenly between Australia and the international market. A local ISP developed the EC application in-conjunction with the owners of the business. The owners of the business primarily conduct the management and support of the web-site. The business is run exclusively in a virtual environment and there is no requirement for a fixed commercial address. There are plans to move the business to a warehouse premise if demand for stock increases. The location of a new premise would not affect the operation of the business. Traditionally the margins on book sales in a retail environment are small. Operating a bookstore on-line further reduces these margins because on-line customers expect discounted prices. Any cost reductions made from operating in a non-retail premise are offset by the discounts expected by on-line customers.

Case X
This is a unique business with few competitors. This VSB has evolved from an conventional business that provides teachers with worksheets used in the classroom. Traditionally teachers have purchased workbooks with numerous worksheets enclosed. The management from the established business decided to create a new business entity based entirely on the use of e-commerce and the on-line marketplace to address clients that have access to the Internet. The new business allows with the ability to download a variety of worksheets as required.

This virtual business model requires minimal resources to run and on-going running costs are very low. The product is cheaper to purchase, more accessible and internationally available. Costs savings have been realised as a result of lower production costs and administration costs (Benjamin & Wigand, 1995). The virtual business application was developed in-house. The application facilitates the process of teacher registration, product ordering and delivery. The current application requires little maintenance and is fully automated. The business has customers both nationally and overseas. The business has no desire to initiate partnerships or alliances with any other firm however the owners are considering adding other links to products or services that would add value to their web- site.

This business reflects a high degree of virtual-ness for a small businesses. This business initially started with three full time employees. They were in-charge of application development and marketing of the product. The business basically operates automatically. Answering the occasional query is all that is required and this can be directed automatically to the most available person at the time. The process or registration, transfer of product and receipting of the product is totally automated. The product is highly appropriate for a web-based business.

Case G
Case G represents another established business that has conceived a new business entity selling fruit trees exclusively on-line. Management from the established business recognised the potential benefits of selling fruit trees directly on-line bypassing the traditional supply chains of associated wholesale and retail nurseries. As a consequence a virtual small business was developed and is administered directly from a farm. From its inception the business was aimed solely at using the web as the only trading platform. The e-commerce application was developed in-house by the owners of the business. The development of the

application was further supplemented by technical expertise from an external Internet Service Provider (ISP). The web-site has taken five years to develop and was created in-house by one of the company directors.
The owners of the business believe by shortening the conventional supply chain, the web has provided a new opportunity to sell their product direct to the end customer. They acknowledge that although the volume of sales may be low compared to traditional retail nurseries, the extra margin gained selling to the public will be adequate compensation. The direct contact with customers allows the owners to provide superior product information and advice, which cannot be matched by retail nursery outlets. Technically the business has the knowledge to grow its products anywhere in the Southern Hemisphere.

This business has no retail address or conventional retail outlets. The business strategy is aimed at selling their products directly on-line. This business exhibits a level of virtual-ness as the business possesses no retail front other than its web interface. Customers can be located globally and although the business may never met them face-to-face the web ensures a high level of customer contact and service. The use of web technologies provides the backbone for this business strategy. The web has enabled this business to establish itself in the global economy and the cost of communicating and marketing this new business to prospective customers is significantly reduced in comparison to its off-line operations.

Case Y
Case Y is a retail shop that sells a range of products to a niche market. Until the advent of the Internet the business idea was not a viable proposition. The accessibility and convenience of selling on-line to a global audience initiated the establishment of the business. The business relies solely on the Internet to market and sell their product range. The owner and his wife operate the business. The business stores minor levels of stock however in most cases when an order is received the supply of the products emanate directly from the supplier to the customer. The business administers the order, transaction and delivery of the products between the supplier and the customer.

The enthusiastic business owner taught himself some basic web development skills and the business' website. The site has been operation for less than a year and they have sole several items. Currently they have not found another website like theirs. The ISP hosting the site provides a secure transaction system, which is offers a high level of security but is easy to manage from the vendor's point of view. The business initially conducted a mail order scheme to get a feel for the potential demand of products. The mail order trail cost $6000 to initiate but only returned less than 1% in sales. The website has received similar sales figures without the administration and marketing costs. The owners of the business have no regrets and find the e-commerce business concept "fascinating".

6.2.3.2 Degrees of virtual-ness displayed by the VSB cases
The virtual-ness exhibited by the preceding case studies highlight that all are overtly virtual small businesses conducting web-based Business-to-Consumer EC. The case studies exhibit a range of attributes that impact on their degree of virtual-ness reflected by the nature of the product being sold, the extent of tele-working

engaged in by company employees, the style of customer interaction and support and centrality of web-based commerce to the business. Analysis of the case data suggests a range of virtual characteristics, which are summarised in Table 6-3.

Case N exhibits virtual business attributes that correspond to the virtual dimension VD1. This small business relies on the collaborative partnerships with each farmer growing the product. There exists a joint level of ownership and organisational control between all parties involved with the virtual organisation. The organisation does not engage or rely on the Internet for any of its key business processes but does use a dial-up connection with a parent organisation for out-sourcing its accounting functions. In order to gain a higher level of virtual-ness the business would need to transform much of the physical processes into informational ones as outline by Rayport and Sviokla (1995).

Representative of VD2, Case G has the potential to gain a higher degree of virtual-ness but is limited by the physical nature of the products they sell. Although the use of e-commerce is central to the business processes they are still reliant on conventional trading and communication methods along their supply chain to coordinate the order and delivery of products. Alternatively Case B and Case X represent businesses that trade in information related products and are able to acquire a greater level of vitual-ness. Case B and Case X exemplify the use of e-commerce to transform an established business into a virtual small business.

Case B has successfully utilised e-commerce to transform the existing business processes to streamline business operations. The case study displays all three characteristics of a virtual organisation as outlined by Boudreau *et al.,* (1998). Firstly, this virtual organisation retains a relationship with software developers effectively out-sourcing all background product maintenance and support. Secondly, the business is totally mobile operating utilising modern telecommuting practices. Thirdly, the business model is flexible and can change dynamically with the environment in which it operates. Virtual relationships can be built and be disbanded in order to enhance the core product.

Case X represents a business that fully exploits the virtual-ness of the web. The use of e-commerce is an essential part of this business. E-mail is predominantly used to facilitate all correspondence with customers. The business has the capacity to reach a global customer market without the need for collaborative links with any organisation. The virtual characteristics evident in Case X enable the business to be replicated on any continent, as the merchandise is information based. . The virtual characteristic of this product is it is easily transferable and maintained (Kambil, 1995). The only limitation is that the information is formatted in English. If the product became multi-lingual the business could grow substantially. Case X does not require the collaboration of key strategic partners however in the future it may be advantageous to forge links with other independent content providers to enhance the existing core product.

Businesses located in VD3 exhibit a high degree of virtual-ness. These businesses could be located in any region of the world. The VSBs that trade in digital related products can potential establish an on-line business that could be managed from any location with an Internet connection. "Dot.com" businesses typify this

business scenario. The use of e-commerce provides these businesses with a high degree of flexibility and mobility, which was not achievable in the past. Case Y and Case AH are examples of a VD3 business. E-commerce is used as a platform to conduct all business processes. The business has customers located nationally and internationally. Operating costs are kept to a minimal level and all communications with clients are conducted via e-mail. The businesses are limited in their degree of virtual-ness by the physical nature of their product. The storage, delivery of their products requires a reliance on conventional storage space and delivery systems restricting the potential virtual-ness in their business.

Table 6-3. Virtual Dimensions of SMEs

	Virtual Dimension 1 (VD1) (Case N)	**Virtual Dimension 2 (VD2) (Case B, Case G, Case X)**	**Virtual Dimension 3 (VD3) (Case Y, Case AH)**
Virtual Small Business Attributes	• High level of co-ordination • Uncertain ownership & control • Conventional "Virtual organisation"	• EC used to support some but not all processes • A mix of traditional and online business practices • Substantial business transformation to acquire virtual traits • These businesses have an inherent business proposition	• New entities with no prior trading history • EC integral to business • Low requirements of capital, labour and infrastructure when compared to VD1& VD2 • Low operating costs • No physical commercial / retail location • Non-core activities outsourced • Global reach, No physical boundaries • Customers predominantly on-line • Highly mobile business (Transferability of business concept)
Dimensions of Virtual-ness	• Collaborative links essential • Reliant Physical Assets • Business not reliant on Web	• Collaborative links not core to business operations • Few physical assets • The web is an integral part of their business	• Non essential collaborative links • Total reliance on web
Application of EC	• EC not integral to virtual business	• Partial Integration of EC into virtual business	• Total reliance on EC
External / Internal Efficiencies	• External efficiencies acquired • Sharing marketing tasks • Economies of scale	• Some internal & external efficiencies obtain	• Exploit full internal and external efficiencies gained from EC •
Products / Services	• Physical	• Physical / Information	• Physical / Information

These six cases studies have displayed varying degrees of virtual-ness in small businesses engaged in B2C EC. These virtual small businesses emerge as a new and distinct sub-set of the broader virtual organisation concept. Definitional ambiguity exists in defining virtual organisations, particularly with respect to small businesses engaged in virtual organising. The conceptual framework proposed in this research aims to distinguish between the various types of VSBs. The range of virtual business attributes exhibited by the firms may explain the variation between the VSBs. These attributes can be categorised by the type of inter-organisational collaboration, use of e-commerce and the Internet, the level of organisation transformation and nature of the product and services. While these VSBs may engage in formalised collaborations in the future, these case studies have shown collaboration is not a determining characteristic of all virtual small businesses.

6.3 Four Phases of E-Commerce Utilisation

The preceding sections provided a discussion of how SMEs use e-commerce. The analysis of the data suggest that SMEs could be distinguished as undertaking a strategic approach or an experimental approach with regards to the use of e-commerce. Further there exists an emergent group of SMEs that actively utilise e-commerce to facilitate different degrees of virtual-ness. These particular groups of SMEs are considered to be virtual small businesses. Based on the interpretation of these findings a model of how SMEs use e-commerce is presented.

The interpretation of the data suggests that the utilisation of web based e-commerce by SMEs can be categorised into four main groups. These include a static use of web based e-commerce, utilising e-commerce as an adjunct to conventional business, utilising e-commerce to change existing business processes and, finally, to using web based e-commerce to facilitate a virtual business structure. A heuristic model was developed to depict the various phases of e-commerce utilisation. The model is presented in the diagram below.

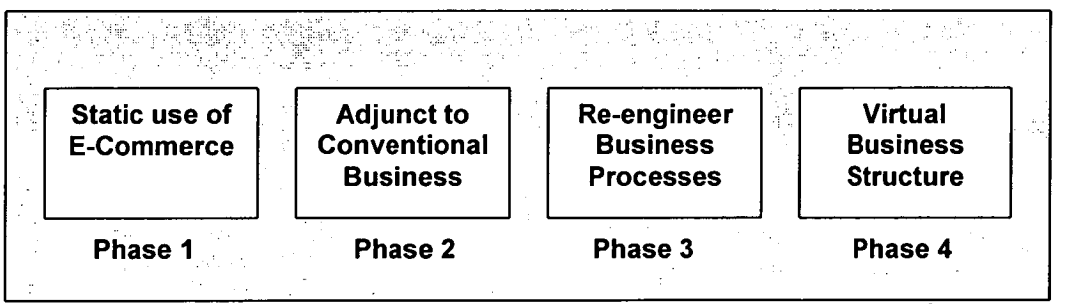

Figure 6-2. A Four Phase Model of E-Commerce Utilisation by SMEs[2]

SMEs participating in this research were found to be resident in at least one of these phases. Table 6-4. presents the spread of cases across the four different phases.

[2] A preliminary version of this model has previously been presented by the author. Chau, S. B., (2001) "Four Phases of Ecommerce a Small Business Perspective: An Exploratory Study of 23 Australian Small Businesses" *Proceedings of the Information Resource and Management Association Conference,* Toronto, Canada 2001

Table 6-4. A Brief Description of Case Studies resident in each Phase

	Type of SME	Primary E-Commerce Application
Phase 1	Micro(2), Small (2), Medium (1)	Electronic brochure ware Product Information
Phase 2	Micro(6), Small(2), Medium(1)	On-line Sales
Phase 3	Micro(4)*, Small(5), Medium (6)	Enhanced Customer Services Sophisticated Intranet, Extranet Data Entry Systems Quality Control
Phase 4	Micro(5)	On-line Sales Email Communications Product Demonstration

* n.b. The micro businesses found in Phase 3 reflect micro businesses that are involved with the ICT industry.

6.3.1 Phase 1: SMEs incorporate a static web presence

These SMEs believe that e-commerce will affect their business in the future. Initially they consider it is important to gain a presence on the Internet.

SMEs representative of Phase 1 are not fully aware of the potential benefits associated with introducing e-commerce into their business but they acknowledge that e-commerce will play a role in their industry in the future. While they lack the strategic foresight of what e-commerce has to offer they feel compelled to have a minor presence on the Internet. Accordingly their web sites tend to be static and require little maintenance. Typically their website portrays an electronic brochure stipulating company information, contact points and details about the products and services their organisation provides. It may also contain a section for frequently asked questions (FAQs) or describe current product and industry news. Although these businesses have a static presence on-line they can actively be using e-commerce for Internet banking and bill payment tasks. These businesses may also use e-mail to complement their existing communication methods. In three out of the five cases management have taught themselves e-commerce development skills to create their own basic e-commerce applications even though these individuals did not possess formal IT skills.

SMEs located in Phase 1 approach e-commerce with an experimental mind set (Section 6.2.1) and it is possible that e-commerce initiatives may lead to future e-commerce developments to allow migration to Phases 2 or 3. Analysis of the case studies located in Phase 1 denotes that the owner/manager of these businesses have a superficial view of technology and e-commerce in particular. The management in Case P viewed information technology as a support tool and not as a business tool offering potential organisational benefits. These SMEs may have the technical infrastructure and capabilities of incorporating more complex forms of e-commerce within their business but are not prepared to commit any further resources pursuing these e-commerce possibilities. In this research, the types of SMEs representative of Phase 1 include all aspects of the SME classification; micro (2), small (2) and medium (1) sized SMEs.

6.3.2 Phase 2: SMEs use e-commerce to supplement their traditional business

SMEs add dynamic and interactive functionality to their use of e-commerce. This does not involve any major transformation to the core business structures in these enterprises.

The SMEs located at Phase 2 have no intention of altering their traditional business trading model. SMEs characterised in Phase 2 do not integrated their e-commerce initiatives directly into existing information systems; e-commerce activities operate in isolation and in parallel to conventional business processes. In the case where SMEs use e-commerce to supplement traditional sales opportunities, any orders or communication from the on-line market has to be re-entered manually into existing office systems. The perceived benefits of increased sales revenue generated by on-line sales, increased customer base and the provision of enhanced customer services provides the primary driver for e-commerce.

These SMEs acknowledged that the perceived benefits from e-commerce are not expected in the short term however they were enthusiastic to continue to support their e-commerce implementations in the hope of long term gains. The analysis of the case study data suggests these SMEs treat their e-commerce activity from an experimental view (see section 6.2.1) and e-commerce is used primarily to support business to consumer transactions, where the consumer is the end user in the supply chain. SMEs categorised in Phase 2 are representative all types of SMEs; micro (6), small (2), and medium (1) sized enterprises, these businesses tend to be more dynamic with their use of e-commerce in comparison to Phase 1 SMEs.

6.3.3 Phase 3: SMEs use e-commerce to substantially re-engineer business processes

SMEs engage in substantial re-engineering of business processes to accommodate e-commerce initiatives. E-Commerce developments become integral to the strategic objectives of the enterprise.

These SMEs depict an advanced stage of e-commerce utilisation. They have an in-depth knowledge of their business and what e-commerce technologies have to offer. They actively look at how best they can use e-commerce to facilitate increased revenue generation by extending their business to the global market place or identify areas where e-commerce can streamline their business processes and supply chains functions with the object of reducing operational costs and inefficiencies.

The utilisation of e-commerce can be complex involving organisational changes to major portions of the business. A strong commitment from management is essential as substantial expenditure and other resources may be required to facilitate organisational transformation in many of the core business processes.

These SMEs have a clear e-commerce strategy (implicit or explicit), that correlates directly with their business strategy. The strategic use of e-commerce

by SMEs located in Phase 3 is explain in detail in section 6.2.2. In this study, SMEs representative of Phase 3 utilise e-commerce to enhance services internally and externally to the organisation. Externally the focus was on improving customer service management procedures, and to lesser extent minor elements in the supply chain. Internally operational efficiencies were sought, reducing operational costs, streamlining the flow of information and management control while aiming to improve the overall productivity of the businesses. The types of SMEs that displayed a strategic notion of significantly changing business processes were predominantly found to be medium sized enterprises as opposed to smaller businesses. In this research fifteen SMEs were considered to exhibit characteristics of Phase 3; Micro (4), Small (5) and Medium (6) enterprises. Small and Medium sized enterprises were found to dominated this Phase, the micro businesses represented in this Phase were all involved with the ICT industry as web developers or consultants.

6.3.4 Phase 4: Virtual Business Structure

The use of e-commerce is fundamental to business operations. E-Commerce is used strategically to support the business.

SMEs found to be at Phase 4 consist of businesses that have either restructured their traditional business to trade completely on-line or are new Internet start-up businesses focusing their core market at the WWW. The Internet start-up businesses ("Dot.com") possess the same characteristics of other Phase 4 SMEs but undergo no organisational transformation in their establishment.

The SMEs found in Phase 4 reflect the characteristics of virtual businesses that are discussed in section 6.2.3. In particular SMEs exhibiting attributes of SMEs characterised by Virtual Dimension 2 and 3 (Figure 6-1) would be considered to represent virtual businesses categorised in Phase 4. Virtual businesses readily embrace new technologies for computer-mediated communications Barnatt (1997). The virtual businesses in Phase 4 rely extensively on e-commerce applications and the Internet. The use of e-commerce is an integral part of their business processes.

These virtual businesses may operate from home or other non-commercial premises substantially reducing overheads of traditional commercial business operations. In some cases the businesses may consolidate their conventional business and regress to a virtual enterprise with few employees.

This could be indicative of businesses located in Phase 3 potentially moving to Phase 4. In Case B the owner of the business aggregated his operation so he was the only full time employee, and contracted associates were utilised as required. He now operates his business in a mobile environment and communicates with customers and business associates via e-mail. Alternatively a movement of Phase 2 proponents to become Phase 4 members can occur if their e-commerce endeavours become distinctly viable. This phenomenon occurred in two Case G and Case X where as a result of their initial e-commerce initiatives, virtual businesses were created and run as separate business entities.

6.3.5 Highlights of the Four Phase Model of E-Commerce Utilisation by SMEs

The Four Phase Model of E-Commerce Utilisation by SMEs presents a heuristic device to categorise the different aspects to e-commerce usage among a range of SMEs. Highlights of each Phase are discussed below along with other notable issues identified in the development of this model.

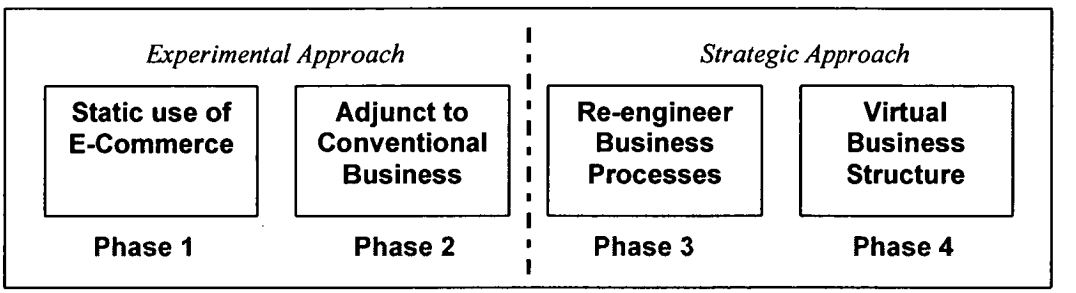

Figure 6-3. Two Perspectives of E-Commerce Usage by SMEs

- The analysis of the data suggests that the utilisation of web based e-commerce by SMEs can be can be categorised into four phases where the phases depicted in the model are not sequential steps of e-commerce utilisation. The position of particular SMEs relies on strategic choices about the use of e-commerce and their readiness to engage in organisational transformation. The study suggests that small businesses do not necessarily progress through distinct stages of e-commerce adoption but may migrate or establish themselves within any of the four phases identified in this research.

- In each of the case studies participating in this research the owner / manager played an active role in the utilisation of e-commerce within their organisation. Although the case studies highlight various degrees of e-commerce complexity, the enthusiasm and motivation to implement and support e-commerce were common denominators. A do-it-yourself (DIY) approach to develop the e-commerce applications was evident in several cases. This occurred for two reasons. The first reason is to offset the costs of financing an external e-commerce developer or, secondly, to acquire personal understanding and experience with e-commerce technologies by experimenting with it (Case A, Case L, Case T, Case V and Case AI). A third approach to developing an e-commerce application was to draw upon extended family and friends to create e-commerce systems for the organisation (Case F, Case J, Case Q, and Case X). The D.I.Y. approach to web development was evident in SMEs located in Phases 1, Phase 2 and Phase 4. SMEs in Phase 3 all hired external consultants to either develop the complete e-commerce systems or to help in-house IT staff with the e-commerce development.

- An exploration of how e-commerce is used by various SMEs suggests that two approaches to e-commerce usage are apparent. A review of the data suggests that e-commerce is employed with either an experimental (Section 6.2.1) or strategic perspective (Section 6.2.2). When we explore these perspectives in relation to the Four Phase Model we find that Phases 1 and Phase 2 denote a high proportion of SMEs that take an experimental approach

to the use of e-commerce while SMEs representative of Phases 3 and Phase 4 indicate a strategic direction.

SMEs categorised in Phase 1 and Phase 2 predominantly take an experimental approach to the use of e-commerce. In Phase 1 the SMEs believe that e-commerce could reduce publishing and marketing costs (Case A, Case C, Case F) and that customer service (Case A) could be improved by having a presence on the Internet. The use of electronic banking (Case N, Case P) for paying bills, transferring money and organising the firm's payroll is considered a beneficial aspect of e-commerce. These SMEs aim at deriving some perceived benefits from e-commerce, although their investment in e-commerce is not substantial in comparison to Phase 3 SMEs. The costs associated with maintaining their e-commerce systems are negligible;

> The cost of actually running an Internet site is cheap as chips. (Case AJ, T26),

and they are happy to support their e-commerce applications in the belief that in the long term they will attain some benefit.

SMEs in Phase 3 indicated a more strategic use of e-commerce. These SMEs identified e-commerce as an important business tool that could provide great benefit for the organisation. The owners / managers understand their business explicitly and identified that e-commerce has the potential to offer additional efficiencies and other benefits to the organisation. The use of e-commerce is principally to improve the level of customer service (Section 6.1.1.3) and to streamline business processes to reduce costs and improve the management of operational tasks (Section 6.1.1.5). This is achieved by providing alternative communication pathways with individuals along the supply chain and providing a system that automated many of the interactive tasks with the organisation and an ability to allow people to self cater to their own queries regarding order, sales, product and services information.

Phase 4 SMEs extend the reliance on e-commerce where e-commerce is an integral part of their underlying business strategy. These SMEs are attracted to the quintessential characteristics of e-commerce that enables individuals to operate a business with a high degree of flexibility and accessibility to global markets, with minimal outlay in terms of organisational infrastructure and support structures. The strategic use of e-commerce is inherent in each of these SMEs; without the use of e-commerce these business would find it difficult to trade with minimal support structures to a local market, let alone an international market base.

- In this research the all types of SMEs (micro, small and medium enterprises) were represented in Phases 1, 2, and 3. In Phase 3, small and medium and micro enterprises were represented however all micro businesses in Phase 3 were members of the ICT industry sector. Only micro businesses were found to exist in Phase 4. Within the classification of SMEs there exists a range of differences between each SME category. The limitations of operating a micro business are greater than that of a small business, which is different again in

comparison to a medium sized enterprise. Technical and financial limitations may exist along with poor levels of experience and expertise with respect to e-commerce. The lack of willingness and motivation from managers/owners to utilise e-commerce further exacerbate the limitations. Reviews of these factors are explored in greater depth in Section 6.6. The analysis of the data with respect to the Four Phase Model suggests that their exists no relationship between firm size and the position of the SME in a Phase regarding it's use of e-commerce. However it appears that there is a predominance of micro businesses located in Phase 4.

- The study was not intended to investigate the use of SMEs across industry sectors however with the expansion of Internet growth and connectivity across various sectors that are representative of SME the possible implications of sector related e-commerce activity will increase. This will be discussed further in the final chapter.

6.4 E-Commerce based Organisational Transformation and potential E-Commerce Benefit

The most significant benefits of e-commerce can be achieved in businesses that integrate e-commerce activities directly into existing business processes. This often requires changes to internal business processes. The magnitude of these changes is dependent on how e-commerce is used by the organisation. In section 5.4 the analysis of three case examples suggest that the impact of e-commerce on the business can initiate changes internal and external to the business. This section discusses the level of organisational transformation conducted by the SMEs participating in this research, in relation to each of the four phases.

The four phase model of c-commerce utilisation outlined in the previous section suggests that SMEs have two perspectives with respect to the use of e-commerce; either an experimental perspective or a strategic one. In this section, the study explores how the level of organisational transformation across the Phases coincides with the utilisation of e-commerce by these SMEs.

In *Phase 1*, SMEs develop a web presence with little or no changes to business processes. The on-going maintenance and support for their e-commerce application is minor.

In Phase 2, SMEs extend part of their business to the on-line environment and the changes to the organisation are more significant in comparison to *Phase 1* SMEs. Some business process may be altered to accommodate their e-commerce activities but for many SMEs (Case T, Case V, Case AI, Case J, Case AJ, Case AA, Case Q, Case D) any on-line transactions are re-entered manually back into old existing information systems. Resources are required to maintain and support their e-commerce initiatives for the duration of their e-commerce venture.

In *Phase 3* significant organisational change is attributed to the use of e-commerce. The introduction of e-commerce significantly changes existing business processes to accommodate e-commerce technologies within the organisation as a consequence the current IT infrastructure may be need updating

or require the purchased of new equipment. The changes to the organisation may also require the re-training of staff and extra resources to help develop, support and maintain the new e-commerce systems.

These e-commerce applications have altered the traditional business processes by streamlining the handling of customer queries. This system alleviates the need to spend time with customers on the phone and fax. Customer service is improved and the organisation can spend resources elsewhere.

The use of electronic forms (Case S, Case E, Case K, Case AC) as e-mail attachments can provide a structured electronic order entry mechanism that can be integrated directly into back office systems. This minimises the chances of human error inherent in manual entry systems and increases the speed of order entry.

Electronic forms also provide alternative methods to communicate with clients and support staff. Electronic correspondence can be received 24 hours a day 7 days a week avoiding the conventional approach of leaving written notes for people that can be lost or passed on to incorrect personnel.

Organisational changes to the communication structure can provide numerous benefits for the operational management of large SMEs (Case E, Case S). SMEs that operate 24 hours a day or consist of a distributed network of branch offices in remote locations (Case O, Case AE), benefit immensely from enhanced communications flows within the organisation and externally to other individuals in the value chain.

External offices and support staff can have direct access to product information and support documentation. Appropriate personnel and potential changes to the production system can be incorporated quickly to retain quality control.

Businesses (Case X) involved with supplying paper-based products and services can reap considerable benefit by transforming their conventional delivery systems to an electronic delivery format. The reduction in production costs and publishing costs are obvious but the automated integration of electronic delivery systems into existing information systems can provide substantial benefit not only to the organisation but also the clients involved. These e-commerce systems allow the clients to cater to their own needs requiring little intervention by organisational personnel.

In *Phase 4* new business strategies are totally reliant on e-commerce technologies and the on-line environment. As discussed in Section 6.2.3 established SMEs might transform their organisational structure to acquire greater e-commerce benefits or alternatively decide to create an independent division or new enterprise focusing on entirely at the on-line market. A substantial business transformation is required for those established SMEs wishing to move to a Phase 4 e-commerce organisation. The potential benefits derived from trading in the on-line marketplace provide the necessary drivers to substantially alter their existing business structure and processes. For some SMEs it is easier to just establish a sub–department or new entity catering to the needs of the on-line marketplace. The Internet also attracts other start-up businesses (Dot.coms) that recognise

potential benefits of trading in the on-line marketplace using e-commerce technologies. Phase 4 SMEs structure their business models to acquire as much advantage from e-commerce as is possible to constitute their business in the on-line environment.

Two SMEs, Case B and Case X were conceived from existing businesses trading in a conventional manner. Case B consolidated its entire business structure to trade exclusively via a website. The owner reduced staff levels to be the sole operator for the business and uses the firm's website to facilitate marketing, demonstration and communication with prospective and existing customers. The business operates as a mobile enterprise where the owner travels the world demonstrating, installing and supporting his product from a portable computer.

Case X initially was part of an organisation that produced paper based educational products. Instead of transforming the entire organisation to become fully e-commerce enabled the owners decided to establish an independent division to trade exclusively on-line. The ordering, supply and payment of products are fully automated. The business uses a website as a shop front to conduct all of its business. A comprehensive e-commerce system handles all orders, delivery and payment of products. Little intervention is required from the business' owners for the daily operation of the business.

Without the foundation of e-commerce technologies and systems, these businesses would not exist. The web-site provides a central point of contact between the organisation and existing and prospective clients. The businesses are upwardly mobile and could be operated from anywhere with an Internet connection. The management is able to updates and maintains the website remotely. This business relies solely on the use of the Internet and e-commerce systems. E-commerce is integral the business.

It is found that the level of organisational transformation tends to increase from *Phase 1* to *Phase 4*. The increase in organisational transformation across Phases is associated to an increase in potential benefits. The relationship between organisational transformation, potential e-commerce benefits and the "Four Phase Model of E-commerce Utilisation" is explored further in the next section.

6.5 A Four Phase Model of E-commerce Business Transformation

A broader analysis of the role of organisational transformation and potential benefits derived from e-commerce within the Four Phase Model of E-commerce Utilisation suggests that a possible relationship exists between the level of organisational change and potential benefits attained from SMEs using e-commerce across each phase. The analysis of the data shows that as an SME increases its degree of organisational change to accommodate e-commerce initiatives the potential benefits derived from e-commerce increases.

Previous research by Venkatraman (1994) identified an association between the range of potential benefits acquired from IT enabled business transformation in a number of large corporations. Venkatraman (1994) identified that the benefits derived from IT were limited if IT was only "superimposed" on the existing organisation infrastructure and business processes. He developed a five level framework of IT enabled business transformations, which acknowledged "benefits accrue in those cases where investments in IT functionality accompany corresponding changes in organizational characteristics" (Venkatraman 1994:74). Venkatraman's framework was tested and validated across a range of organisations, which predominantly included large corporations. Although there was no specific mention of Venkatraman (1994) testing his framework with regards to SMEs it could prove beneficial if applied to these smaller sized businesses.

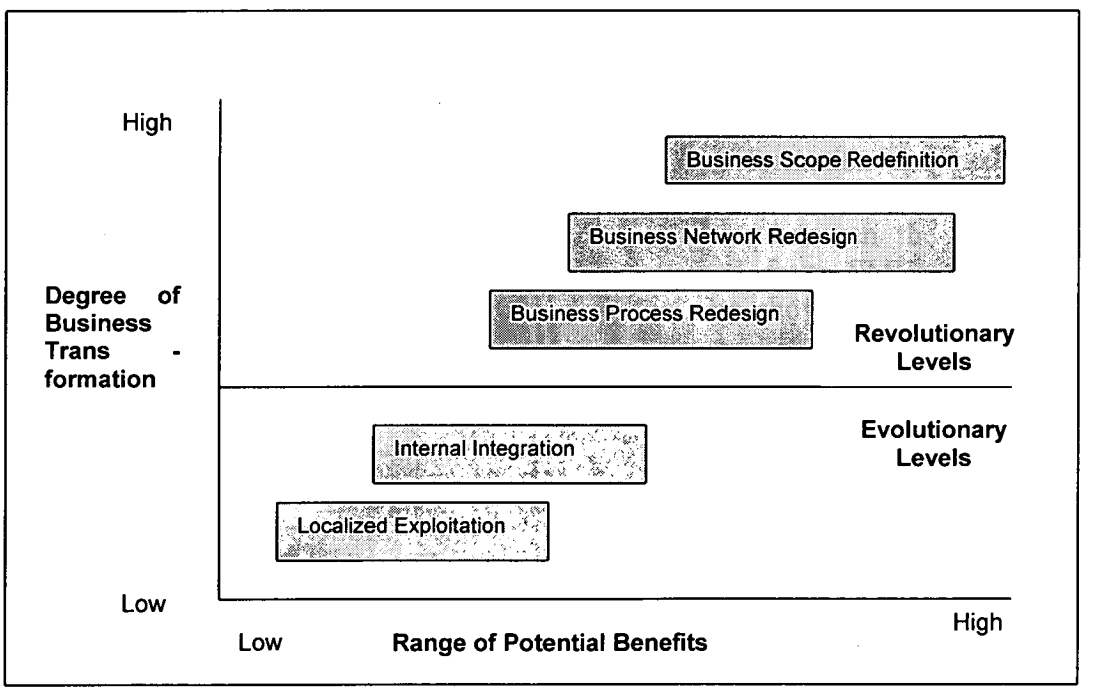

Figure 6-4. Venkatraman's Five Levels of IT-Enabled Business Transformation framework (1994:74).

Research by Poon and Swatman (1997a) supported aspects of Venkatraman's framework. They acknowledge that small businesses have the potential to improve their strategic position, when small businesses engage in 'Internet to internal application integration'. Their model signifies that as small businesses increase the level of Internet to internal application integration, the potential benefits to the organisation increase.

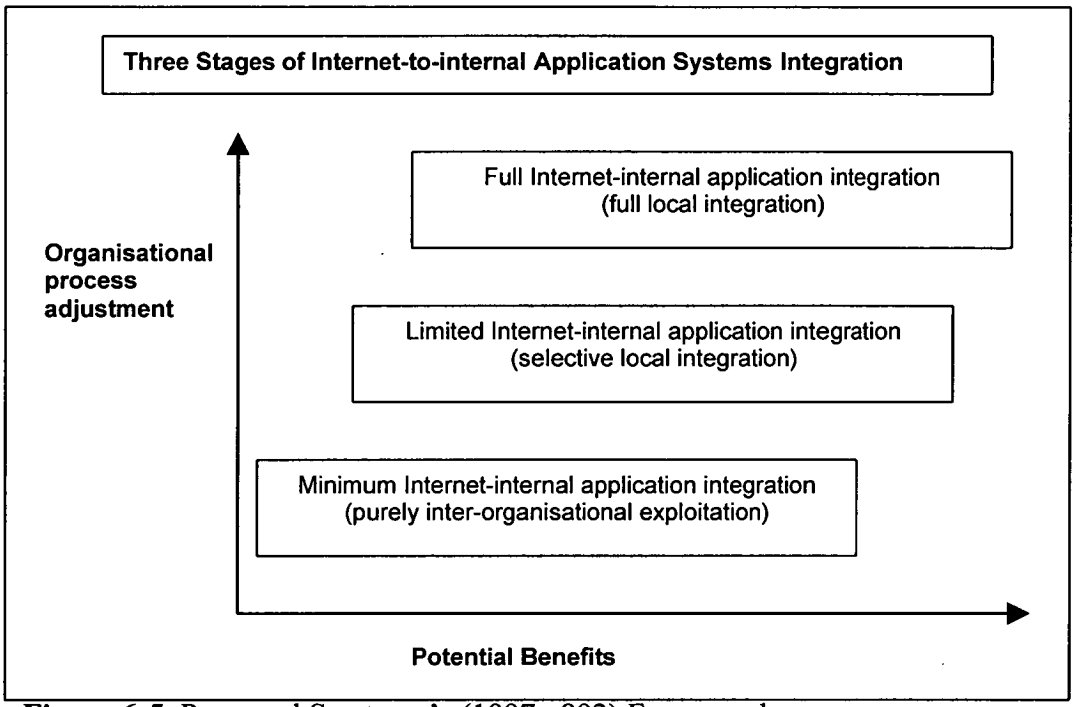

Figure 6-5. Poon and Swatman's (1997a:892) Framework.

This thesis draws upon Venkatraman's (1994) framework and Poon and Swatman's (1997a) model to explore the relationship between the potential benefits from e-commerce and organisational change with regards to the *Four Phase Model of E-commerce Utilisation* developed in section 6.3. A subsequent framework, the "Four Phase Model of E-commerce Business Transformation" is proposed to highlight the relationship between the degree of organisational transformation attributed to e-commerce and the potential e-commerce benefit available to SMEs. The framework proposes that the potential benefits derived from e-commerce relates to the degree of organisational changes attributed from web based e-commerce. As the amount of organisational change increases the ability to derive potential benefits from e-commerce increase.

A caveat exists for new Internet start-up businesses (Dot.coms) that structure their organisational processes to directly leverage e-commerce technology and the on-line environment. These businesses are established to specifically customise their business processes to maximise the potential benefits from e-commerce.

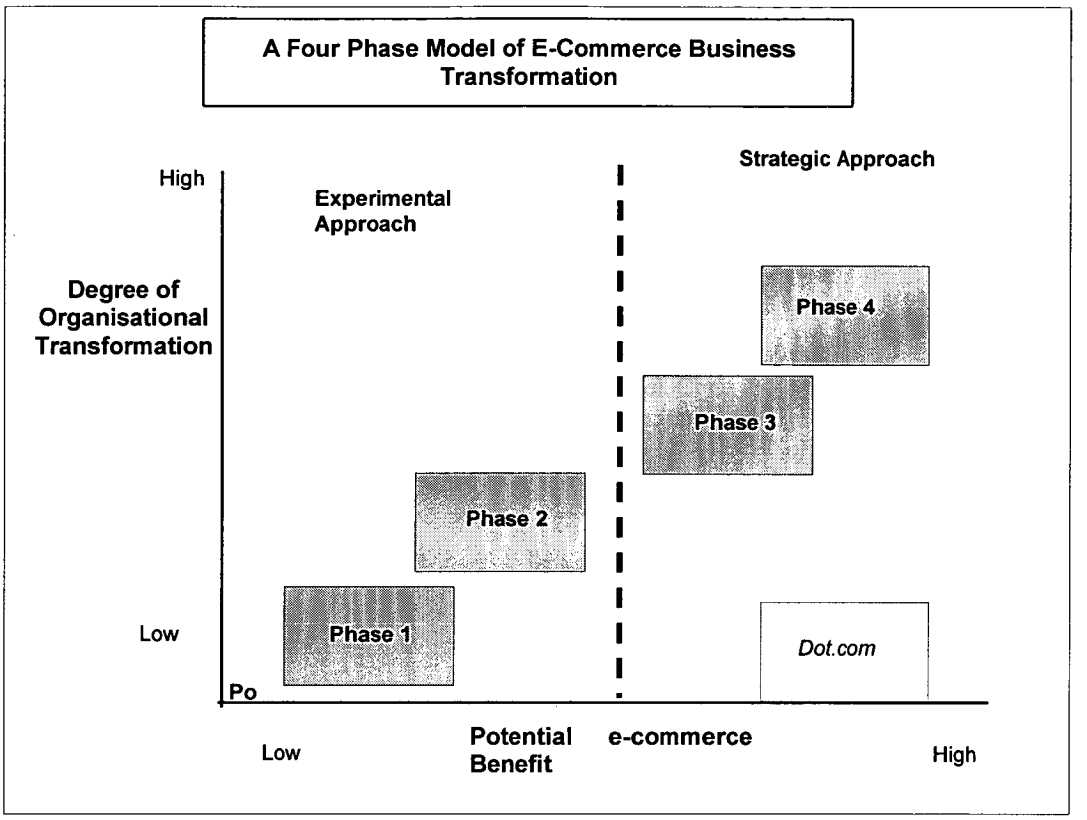

Figure 6-6. Four Phase Model of E-Commerce Enabled Business Transformation[3]

This model in Figure 6-6 explores the relationship between the degree of organisational transformation and potential e-commerce benefit for each phase of e-commerce utilisation by SMEs. The model illustrates the four phases of e-commerce (see section 6.3) and includes *Position Po*, which signifies those SMEs using basic electronic banking activities that have not engaged in any other web based e-commerce. Phase 1, Phase 2, Phase 3 and Phase 4 have been previously discussed in detail in section 6.3. The notion of the *Internet Start-up Businesses* (*Dot.com*) is also acknowledged. *Dot.com* start-ups are *Phase 4* businesses that do not undergo the organisational transformations being discussed in the context of the case studies. These types of SMEs have a high potential to acquire benefit from web-based e-commerce and undergo minor organisational changes once they are established.

SMEs depicted at Phase (Po) may adopt basic e-commerce banking functions such as electronic funds transfer (EFT), EFT point of sale (EFTPOS), phone banking and electronic bill payment (BPAY). They have not however incorporated any web-based e-commerce.

[3] The author has published a preliminary version of this model. Chau S.B. and Turner P. (2001) "A Four Phase Model of EC Business Transformation amongst Small to Medium Sized Enterprises: Preliminary Findings from 34 Australian Case Studies" *Proceedings of the 12th Australasian Conference on Information Systems,* Coffs Habour, Australia 5-7 December.

In Phase 1 and Phase 2 the absence of direct integration between e-commerce initiatives and internal applications limits the potential benefits attained from e-commerce. However the use of e-mail as a precursory form of inter-organisational system between trading partners and customers can form the basis for more elaborate inter-connectivity at a later stage. The minimal use of e-commerce to internal application integration is reflected in the first stage of Poon and Swatman (1997) model.

The level of organisational change to accommodate the integration of e-commerce applications in Phase 3 and Phase 4 concurs with the higher stages of Internet to internal integration highlighted by Poon and Swatman (1997). The integration of e-commerce into existing internal applications for SMEs located at Phase 3, may follow a series of stages within the phase depending on the strategy formulated by management in the business. A "full Internet to internal application integration" described in Poon and Swatman's (1997) model may be evident in advanced users of e-commerce in Phase 3 or Phase 4, which have entrenched the use of e-commerce applications into their business processes and infrastructures. However this research also acknowledges that SMEs can directly established themselves at Phase 4 with-out necessarily following a set of stages of e-commerce to internal application integration.

Dot.coms
These types of SMEs are conceived to exploit the full potential of the Internet and e-commerce technologies. Internet start-up businesses undergo no significant organisational transformations once they are established but possess the potential to reap similar benefits as Phase 4 SMEs. Their organisational infrastructure is based on e-commerce technologies, with the intention to leverage as many benefits from e-commerce as possible. The drivers for using e-commerce focus on the flexibility, low operational costs and efficiency gains from using e-commerce technologies.

6.5.1 Key elements of the Model

The *Four Phase Model of E-Commerce Business Transformation* extends the analysis of the case studies' use of e-commerce. More specifically it reflects the relationship between organisational change across each phase and the potential benefits gained using e-commerce. Three key propositions emerge from this model based on analysis of the case study data.

- The framework developed in this study highlights two perspectives (experimental or strategic) for the use of e-commerce by SMEs. Analysis of the data suggests that SMEs located in Phase 1 or Phase 2 to exhibit an experimental approach to the use of e-commerce (Section 6.3.1). The potential benefits derived from e-commerce are limited and restricted by the lack of organisational change. In contrast a more strategic approach is evident in Phase 3 and Phase 4. In advanced phases of e-commerce utilisation the integration of e-commerce is strategically applied to existing business processes, organisational strategies and existing infrastructure. The strategic

emphasis requires greater resources and organisational transformation but has the capacity to potentially provide significant e-commerce benefits.

- The potential benefits derived from e-commerce activity increase where enterprises engage in a process of organisational transformation relating to e-commerce. As investment in e-commerce technologies increases optimal benefits can only be obtained by suitable changes in organisational structure and processes. The SMEs engaging in the highest degrees of organisational transformation will achieve optimal benefits from utilisation of e-commerce.

  This study supports the relationship, identified by Venkatraman's (1994), between the potential benefits derived from IT and the degree of organisational transformation. However the focus of the research prescribed in this thesis is in the use of e-commerce as opposed to IT. Research by Poon and Swatman (1997) also indicates this association but the focus of their model concentrates on the level of Internet to internal application integration in small businesses.

- The *Four Phase Model of E-Commerce Business Transformation* again uses the term phase to acknowledge that the four positions are not necessarily distinct or independent from one another and that SMEs may often be in a transitional state between phases. The position of SMEs within this model relies on strategic choices about the use of e-commerce and their readiness to engage in organisational transformation. Subject to business directions and strategic goals it is possible through investment for an SME to migrate or establish themselves directly at any one of the four phases. It also encapsulates the view that the desirability of any phase for an SME relates directly to its business directions and broader strategic goals.

  Venkatraman (1994) did not support the notion of a set of evolutionary stages in the utilisation of IT. In his view the process follows a dynamic pathway that he described as a transformation trajectory. "It is important to underscore that these levels are not conceptualized as stages of evolution because effective strategies do not (and should not) follow any one prescribed model of evolutionary stages." (Venkatraman 1997:75).

  In contrast the analysis by Poon and Swatman (1997) concede that the organisational changes attributed by Internet to internal application integration proceeds over a number of stages. However the stages of transformation in their model begin from an inter-organisational dimension rather than a "localised exploitation" of IT found in Venkatraman's first level of transformation. In the context of this research it is conceivable that within a given phase the possibility of businesses proceeding through a number of set stages is plausible.

A range of factors internal and external to SMEs influences the ability for SMEs to implement change to the business and acquire benefits from the incorporation

of e-commerce. These factors affect the relative position of SMEs within a phase and govern the ability of SMEs to move between phases. The next section explores the factors that emerge from the analysis of the data that influence a SMEs ability to utilise e-commerce.

6.6 Factors affecting the implementation of E-commerce by SMEs

This section describes the factors identified in this research, which affect the capabilities of SMEs to execute organisational changes and achieve benefits from e-commerce. While many of these factors are beyond the direct control of the individual SMEs there exists a range of factors that can be influenced by the business. Section 5.5 identified several factors internal and external that influence the ability of the three case examples to conduct e-commerce. This section extends the interpretation of the data analysis across all cases.

6.6.1 Internal factors influencing SME E-Commerce business transformation

The factors that SMEs have the potential to control are internal factors. The internal factors can affect a SME's ability to conduct e-commerce enabled business transformation. From an analysis of the internal factors two core categories became apparent: organisational factors and technological factors. The analysis of large organisations by Venkatraman (1994) also identified these two categories as internal factors impacting on the organisational transformation. Venkatraman (1994) further identified technological factors relating to cost performance trends and connectivity capabilities. While organisational factors relate to managerial assertiveness, motivation and financial constraints. The technological factors identified in this research of SMEs can be distinguished into technical factors relating to IT and technical factors related to e-commerce, as outlined in Table 6-5.

Table 6-5. Internal factors influencing SME E-Commerce Business Transformation[4]

Organisational:	**Technological:**
Management • Role of Management • Leadership Qualities • E-Commerce Driver • E-Commerce Strategy *Internal Resources* • Financial (Cost) • Human Resources • Time	IT Technical Factors • IT Skills / Experience / Support • IT Infrastructure E-Commerce Technical Factors • E-Commerce Skills / Experience • E-Commerce Infrastructure

[4] The author has previously published an initial analysis of these internal factors. Chau S.B. and Turner P. (2002) "Four Phases of Ecommerce: An Analysis of Factors impacting on SMEs potential to derive benefits from web-based Ecommerce: 34 Australian Case Studies" *in Proceedings of the International Information Resources Management Association (IRMA) Conference,* Seattle, USA, 2002.

6.6.1.1 Organisational Factors

In this research of SMEs, organisational factors are divided into factors that relate to *management* issues and factors relating to the level of *internal resources* available for e-commerce initiatives.

6.6.1.1.1 Managerial Factors

Managerial factors have been found to significantly influence the incorporation and utilisation of technology in business (Cragg & King, 1993; Thong & Yap, 1995; Thong *et al.*, 1996; Poon & Swatman, 1997b; Chappell & Feindt, 1999). The data analysis from this study acknowledges four key areas relating to the management.

Table 6-6. Managerial Factors that influence the Utilisation of E-Commerce

Role of Management ▪ Enthusiasm / motivation for change ▪ Management interest in technology ▪ E-Commerce Skills
Leadership Qualities ▪ Driver for innovation / change ▪ Pro-active ▪ Entrepreneurial
E-commerce Driver ▪ Cost Reduction ▪ Revenue Generation ▪ Customer Relations ▪ Enhanced Communications
E-Commerce Strategy ▪ Experimental use of E-Commerce ▪ Strategic use of E-Commerce

Management plays an important role in the implementation and utilisation of e-commerce. Management skills, leadership qualities and strategic direction directly impact on the ability of an SME to engage in e-commerce. The level of enthusiasm for e-commerce and interest in technology were characteristics that reflect on the level of e-commerce knowledge and understanding possessed by management in the case studies.

The leadership qualities of management emerged as another important factor contributing to the utilisation of e-commerce amongst SMEs. Managers that appeared to be pro-active and entrepreneurial with information and

communication technologies, were key drivers for e-commerce within the business.

In all cases the owner/manager was central to e-commerce adoption and continued utilisation. In Phase 1, business managers acknowledge the potential value of e-commerce but use it in a minimal manner. Regardless of SME size Phase 1 enterprises regard e-commerce as contributing a minor but useful role as a support tool in the day-to-day business operations. In Phases 2,3,4 management identify economic value as justification for using e-commerce. The owner/managers are pro-active in their use of IT and e-commerce even though some of these people consider themselves to be lacking in IT illiteracy.

The drivers promoting the utilisation of e-commerce and the strategic direction of e-commerce can directly influence the degree of business transformation. Analysis of the data suggests that the use of e-commerce can be classed as strategic or experimental. The strategic use of e-commerce within the business is likely to create greater organisational transformation than an experimental approach. The greatest benefits from e-commerce will only accrue when SMEs treat e-commerce as a strategic tool and engage in organisational transformation to leverage competitive advantage as opposed to an experimental utilisation of e-commerce (Chau & Turner, 2001b). The existence of an e-commerce strategy (either implicit or explicit) can be an instrumental factor in determining how e-commerce is used within the business.

The strategic direction of e-commerce varied across the phases. In Phases 1 and 2 utilisation of e-commerce is experimental. E-Commerce is used as a complementary marketing and sales function. It is applied independently of existing information system processes and no formal integration exists between existing IT applications and e-commerce endeavours. Thus potential benefits of increased efficiencies and cost reductions are absent. In Phase 3 e-commerce is valued strategically with the utilisation involving direct linkages into existing IS/IT structures. The strategic use of e-commerce is aligned with implicit/explicit business strategies aimed at acquiring efficiencies, cost reductions, improved customer service and streamlining existing business processes. In Phase 4, businesses rely completely on web-based e-commerce as their business infrastructure. E-Commerce is used as a strategic platform, central to their business operations without which these businesses would not exist.

Forging strategic alliances between SMEs can complement a business' ability to derive organisational efficiencies. The use of e-commerce is pivotal to the development of such alliances and the support of virtual business transformations (Chau & Turner, 2002b).

6.6.1.1.2 Internal Resources Factors

The amount of internal resources available for e-commerce activities significantly affects the ability to implement and support e-commerce initiatives. The allocation of budgets, human resources and time directly influence the nature of e-commerce developments and ongoing maintenance.

Table 6-7. The Influence of Internal Resources in the Utilisation of E-Commerce

Financial Resources (Cost) ▪ Capital to invest in technology ▪ Capital to support on-going IT investment
Human Resources, Time ▪ Staff (technical knowledge, experience) ▪ Skills to manage e-commerce ▪ Training

Financial constraints have previously been cited in the literature as barriers to the adoption of e-commerce (NOIE, 2000; Lawrence & Keen, 1997; Poon & Swatman, 1998). In this study the analysis reveals that the availability of financial resources did not form a significant inhibitor the active utilisation of e-commerce utilisation particularly amongst small and micro businesses. In four cases (Case A, Case G, Case T, Case Y) the owners developed their web site themselves to save costs in another four other cases (Case J, Case Q, Case X, Case AI) family or friends help develop the e-commerce applications. Case Y indicated that the return on their e-commerce initiative was cost effective;

> ... still we nearly had as many orders on the Internet in the past six months as we did spending $6000 on the mail-out. And we haven't told anybody about the Internet site. (Case Y, T18).

Although significant costs may be required to establish the e-commerce application in Case AJ, the ongoing costs were relatively low.

> the cost of actually running an Internet site is cheap as chips (Case AJ, T 26)

The businesses that traded in physical products had to be wary of freight charges as the actual cost of delivery could make the on-line sale unfeasible. This potentially presented problems particularly for businesses selling goods to an international customer base.

> We have to be very careful of our shipping costs, because shipping is expensive. People do look into the costs and so we have to keep down to a minimum. So all in all we probably loose money in shipping, not that we try to gain but we do try to cover the costs in packing (Case AH, T9)

Notably, the SMEs included in this study were active users of e-commerce the study did not include businesses that have failed to implement e-commerce as a result of prohibitive costs.

The introduction of innovation requires time and personnel to integrate, train and maintain new systems within a business. SMEs that allocate staff to e-commerce

activities place extra constraints on staff resources. The cost of providing training and other change management functions entails additional investments that are potentially difficult to recoup. SMEs are fortunate if they have staff with inherent levels of technical knowledge supplying in-house IT/EC skills to help develop and maintain e-commerce applications. For many of the small and micro businesses included in this study the owner/manager took an active role in the development, implementation, utilisation and maintenance of the e-commerce applications. If these services cannot be provided in-house, the services may be out-sourced to external providers, incurring added expense. Management in some SMEs indicated that the knowledge gained from a "hands on" approach to e-commerce development provided unexpected advantages. These advantages relate to an increased understanding and knowledge of e-commerce and its technologies that could be applied to other businesses owned by some of case study participants (Case Y and Case AJ).

6.6.1.2 Technological Factors

The analysis of the data reveals two types of technological factors. The technological factors can be distinguished into technical issues relating to information technology and electronic commerce issues. It is an advantage for business to have staff with technical skills and experience in both information technology and e-commerce.

Table 6-8. The Influence of Technological Factors in the Utilisation of E-Commerce

IT Technical Factors ▪ IT Skills / Experience / Support ▪ IT Infrastructure Hardware IT Applications Open /Closed systems
E-Commerce Technical Factors ▪ E-Commerce Skills / Experience E-commerce development / e-commerce support Ability to integrate existing IS systems ▪ E-Commerce Infrastructure E-Commerce Hardware Security Issues E-Commerce Application Customer Centric Security

6.6.1.2.1 IT Technical Factors

The IT technical factors can be distinguished by the amount of IT skills and experience available to the business and the level of sophistication of the IT infrastructure.

IT Skills and Experience

In this study several cases had management possessing various levels of IT skills. For some these skills were formally acquired while in other cases the skills set were self taught or acquired as e-commerce was introduced to the business. The level of IT experience amongst the SMEs was varied but all had access to the skill sets required by drawing on basic IT skills acquired by necessity in the past, through family and friends or by developing their own skills.

In-house development can reduce e-commerce costs and enhance in-house knowledge and experience potentially providing a competitive advantage. From the analysis, the use of external developers often generates problems particularly where e-commerce requirements have not been formalised or when the reported skills and services of developers and Internet Service Providers (ISPs) have been overstated. Although the medium sized businesses included in the study had in-house IT officers or divisions their capacity to implement e-commerce initiatives did not always result in a comprehensive utilisation of e-commerce. This was partly due to the strategic approach to e-commerce adopted by these medium sized enterprises, particularly in Phase 3 where the utilisation of e-commerce was focused on gaining a specific on-going return from the e-commerce investment.

IT Infrastructure

The IT infrastructure of SMEs included in this study ranged from stand-alone personal computers to wide area networks linked across Australia. For some cases a stand-alone computer set-up is all that is required to implement and utilise e-commerce.

A stand alone computer with Internet access was common in four cases. For some SMEs, their home computer was used to develop and maintain their e-commerce utilisation. Their ability not to host the website or e-commerce applications did not emerge as a major hurdle for the SMEs.

The issue of integrating e-commerce functionality into existing back-office systems presented problems for several Phase 3 and 4 firms. Medium sized businesses Case E and Case R in particular incur problems relating to the integration of e-commerce applications.

> It was certainly not an open system. Integration into the existing accounting system was one of the biggest challenges. One of the early hurdles was getting around it. (Case E, T33)

> Yeah just a nightmare, absolute nightmare but that being said the product we've got up and running now is several thousand bug catches later from Oracle is actually really quite solid, it's a good product but getting there I suppose it was a long learning curve. (Case R, T44)

If the software is not constructed to an open standard it presents problems for businesses trying to integrate e-commerce functions into closed/legacy systems. Problems also arise for small and micro businesses using off the shelf accounting packages that try to integrate e-commerce functions into these proprietary systems.

6.6.1.2.2 E-commerce Technical Factors

Technical factors relating to e-commerce can be discussed in terms of the available e-commerce skills and experience internal to the organisation and the level of e-commerce infrastructure at hand.

E-Commerce Skills / Experience

The e-commerce skills and experience varied considerably amongst the SMEs however the lack of formal IT or e-commerce knowledge and skills did not necessarily relate to a lack of e-commerce sophistication.

The development of the e-commerce systems could be categorised into three scenarios. These were:

- e-commerce application developed by external web developers;
- e-commerce application developed by family or friends;
- e-commerce application developed internally by owners / managers or by IT staff where e-commerce development skills were often self taught.

Interestingly the most problems reported by respondents related to the development of the e-commerce systems or services provided by the external web developers or ISPs (Section 5.6). Cases (C, V, AH, AI and AJ) incurred problems with their respective ISPs that related to a lack of service or e-commerce skills. Businesses that opted for the development of their e-commerce systems by external entities often lacked the IT skills and e-commerce knowledge to physically develop their systems. Although their desire to implement an e-commerce application remained strong in reality the costs of development, implementation and maintenance were significant. In this scenario the return on investment is protracted over a long period of time compared to those businesses that were able to get a close relative or friend to develop the application at a cheaper rate or better still develop the e-commerce application themselves. A potential problem exists when the skills and knowledge to maintain and support the e-commerce application are not inherited by the business and ownership of the site is not acknowledged by the business. The ongoing costs for support provided by external entities further reduces the potential return on investment.

The businesses that were able to acquire the skills to internally develop their e-commerce systems potentially gained a better chance to recoup their e-commerce investment sooner due to the lower establishment costs from doing-it-themselves.

> I thought this is great we can put this site on the web and it can sit there with out a great cost and we will see how it works. (Case AJ, T6)

They also believed they gained a competitive advantage by creating their own e-commerce systems.

> To a certain extent it is important to experience it yourself first hand even if you were to take an outside consultants view very often as they are not involved with the day to day running of the business there are aspects that they don't hear or see of. (Case AI, T14)

The skills acquired from developing the system can be applied for ongoing maintenance and support. As e-commerce technologies become more advanced the ability for people to develop their own e-commerce application becomes easier.

E-Commerce Infrastructure

E-Commerce security measures need to be considered when installing and developing e-commerce hardware and applications. This issue is important particularly for Phase 3 and Phase 4 SMEs that may directly integrate e-commerce functionality into back office systems especially when web sites are hosted internally by the business. In some cases this issue was addressed by posting a mirror copy of the organisations database with the Internet Service Provider. This way the original master database is physically protected from attack.

Although this provides some degree of protection it can also retard the potential benefits accrued from e-commerce interacting with a live database. Another potential security risk arises in those businesses conducting on-line transactions. Internet fraud is problematic and hard to detect. Case AH, operating an on-line store unfortunately experienced this criminal activity and incurred a large financial setback.

> We have been caught several times. We have not found a fool proof way. There is at this stage no way to identify people on the Internet. (Case AH, T6).

Security is a factor that needs to be addressed internally and conveyed externally to users of an organisation's e-commerce applications.

6.6.2 External factors influencing SME E-Commerce Business Transformation

This thesis acknowledges a range of external factors that influence a SME's ability to acquire e-commerce benefits. Although these external factors are less significant in terms of influencing the ability of SMEs to engage in organisational transformation, they emerge as very important to derive benefits from e-commerce. From the analysis these external factors fall into four categories:

- the nature of the supply chain;
- the influence of industry structures;
- the influence of external service providers and
- the role of government.

These are outlined in Table 6-9.

Table 6-9. External Factors that effect SME's ability to acquire E-Commerce Benefit[5]

Nature of Supply Chain ▪ Level of Automation in Supply chain ▪ Communication Methods Used ▪ Size and Number of Participants (critical mass) ▪ Other Participants Internal Factors	External Service Providers (IT / E-commerce consultants / developers) ▪ Level of Experience ▪ Ability to Understand Organisational Needs ▪ Level of Service ▪ Available Skill Set
Industry Influence • Level of industry support for change • Information and Education • Business Champions / Drivers • Strategic Alliances	Government Support ▪ Policy and E-Commerce Framework ▪ Type of Sector Strategy ▪ Financial Assistance / Encouragement

6.6.2.1 The Nature of the Supply Chain

Business-to-Business

From an analysis of the data the level of supply chain automation remained generally low across cases included in the study. Most cases indicated that the primary form of communication with suppliers remained phone, fax and to a lesser extent e-mail. The problem of critical mass was identified by many of the SMEs. Until a critical mass of suppliers actively using e-commerce eventuates across the supply chain the potential for e-commerce benefits is limited.

> The problem we have is that a lot of our customers have run down small shops or small operations that don't have the technology so they can't sort of say we will put a PC in and email you an order. (Case S, T30)

Distributors and wholesalers included in the study expressed a desire to utilise more e-commerce in doing business with resellers and other participants but recognised these resellers were not at the time technologically capable. However SMEs with direct contact to consumers conducted more e-commerce transactions. It was reported that the ability for individual SMEs to influence the supply chain environment is small. An explanation for this is that large firms dominate the industry and aspects of the supply chain.

Business-to-Consumers

The critical mass of consumers is an important factor for those SMEs that primarily focus their e-commerce activities at the business-to-consumer side of the supply chain.

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[5] A preliminary analysis of external factors has been previously presented. Chau S.B. and Turner P. (2002) "An Exploration of Factors that influence the ability of Small and Medium Sized Enterprises to Engage in Electronic Commerce: Preliminary Findings from 34 Australian Case Studies" *in Proceedings of the 13th Australasian Conference on Information Systems*, Melbourne, Australia December 2002.

> The problem is the customers. We discussed earlier on about the Internet situation as a whole open. When you start talking to teachers its even worse. Firstly there's a huge range of teachers who are my age and not into computers. (Case X, T21)

The ability to reach a broader range of consumers located nationally and internationally has been a major driver in the use of e-commerce by many of the SMEs included in this study. However the relative success of the e-commerce systems is not only gauged on attracting clients to the site but converting the customer attraction into actual sales or active users of the services provided on-line (See Section 5.6). If the customers targeted by the business are not on-line or have access to the Internet the potential e-commerce benefit is significantly reduced.

> I think been farmers they don't really have a lot to do with Technology. Many farmers don't have the Internet available in some areas. So I can see coming from their angle they may say fine computers are good for what they do. But there is no huge benefit in having them. (Case AE, T30)

The SMEs that have previously established their business in the marketplace are at a significant advantage. It is easier to trade to an established list of clients than it is to attract new clients and convert these into on-line sales or users of on-line services. Cases E,R, S, AC are examples of Phase 3 businesses that have derived actual benefits from the use of e-commerce by using e-commerce to provide alternative cost effective transaction mechanisms to an established list of clientele. Specifically Case E and Case R consulted with clients in the design and development of their e-commerce applications to assure customer acceptance of their e-commerce activities. An important part of this process is to determine that the target group of e-commerce users or customers has the desire and capability of interacting on-line.

6.6.2.2 Industry Influence

The case studies identified that none of the SMEs received or believed it would be worthwhile to seek help from their industry in developing their e-commerce initiatives. In addition none of the cases mentioned the industry association as agents supporting change.

> The sort of people who wholesale in our industry are put mildly totally backward. I mean there there's this total attitude about ah ultimately you know the book comes from one source. There's no competition for the book, if you want a book that Joe Blow has written then ultimately you have to order from them because they know they've got you. Their attitude is bloody awful. (Case AJ, T28)

There is consensus among the SMEs that there is a general lack e-commerce business champions and lack of industry support to disseminate e-commerce information, e-commerce education and e-commerce training. This is reflected by the lack of power individual SMEs possess over the industry, its policy and business strategies. More significantly the desire to form strategic partnerships and alliances based on e-commerce among the case studies was not a high priority. The SMEs involved in this study did not consider the formation of strategic alliances as an essential part of e-commerce (Section 5.5.2). However the

SMEs connected with the ICT industry did recognise the value of establishing formal and informal trading relationships with other businesses in their industry.

An analysis of a SMEs utilisation of e-commerce based on their industry sector classification was not within the scope of this research. Although it was not an objective of this study, the growth in SMEs using e-commerce as a sector strategy development is gaining interest. A colleague in the researcher's School of Information Systems has investigated the collaboration of SMEs use of e-commerce within a Tasmanian industry sector. Lawrence's PhD thesis (2002) "Factors inhibiting the collaborative adoption of electronic commerce technologies in a Tasmanian Industry Sector" underlines the use of e-commerce in many facets of that industry.

6.6.2.3 External Service Providers (IT / e-commerce Consultants / Developers)

ISPs emerged as important support structures for hosting web-sites and for providing input in their development. The problems experience by SMEs are associated to the poor level of service provided by ISPs and web developers who emerged as one of the largest external problems for SMEs utilising e-commerce.

> Primarily, it (*the ISP*) evolved that they were not able to guarantee the level of access we required. They couldn't guarantee the number of connection hours. During peak time you may be on-line then you would be booted off. Which was hopeless. So that's basically why a succession of providers came and went. They did not provide the level of service that they claimed. (Case AI, T7)

This was particularly evident amongst SMEs with limited IT skills and experience.

> I think the thing that a lot of us suffer from is a lack of well, we all suffer from a lack of knowledge apart from the guys who really are computer geeks but even then they suffer from a lack of commercial knowledge. They may have the technical knowledge but not the commercial knowledge and the problem, the main problem, is trying to find people who know what they're talking about and there is an awful lot of people out there offering all sorts of services and they haven't a bloody clue. (Case AJ, T34)

A lack of knowledge and experience by ISP / E-Commerce developers was evident in three cases (Cases AI, Case AJ and Case V) representing SMEs in different phases of e-commerce utilisation. From the case studies, businesses that developed e-commerce applications in-house had the least number of problems.

6.6.2.4 Government Support

Analysis of the case studies indicated that the level of government assistance had been only a minor consideration in the adoption and utilisation of e-commerce among the cases studied. A number of government approaches were mentioned including: education and awareness programs for breaking down the barriers of misinformation and e-commerce adoption fears; direct financial assistance in terms of capital funds to subsidise e-commerce efforts helped a number of the small and micro enterprises. More generally the cases did reveal that other

Government policies including tax and other initiatives were identified as potentially significant factors. These external factors affect the environment in which these SMEs operate. However the external factors do not directly affect the ability to conduct organisational transformation. An exception exists when the government provides financial assistance or grants for SMEs engaging in e-commerce initiatives, education and training.

6.7 Factors and Forces: Affecting SMEs ability to derive benefit from E-Commerce[6]

The analysis of the data suggests that SMEs are exposed to a range of factors that can have an enabling or inhibiting effect on the ability of an SME to derive benefit from utilising e-commerce. Before presenting a model of these interactions it is important to identify the range of enabling and inhibiting forces that these factors can generate. Ultimately it is the mix of enabling and inhibiting forces generated by the interaction of these factors that determines the extent to which e-commerce benefits can be realised in each phase of e-commerce utilisation.

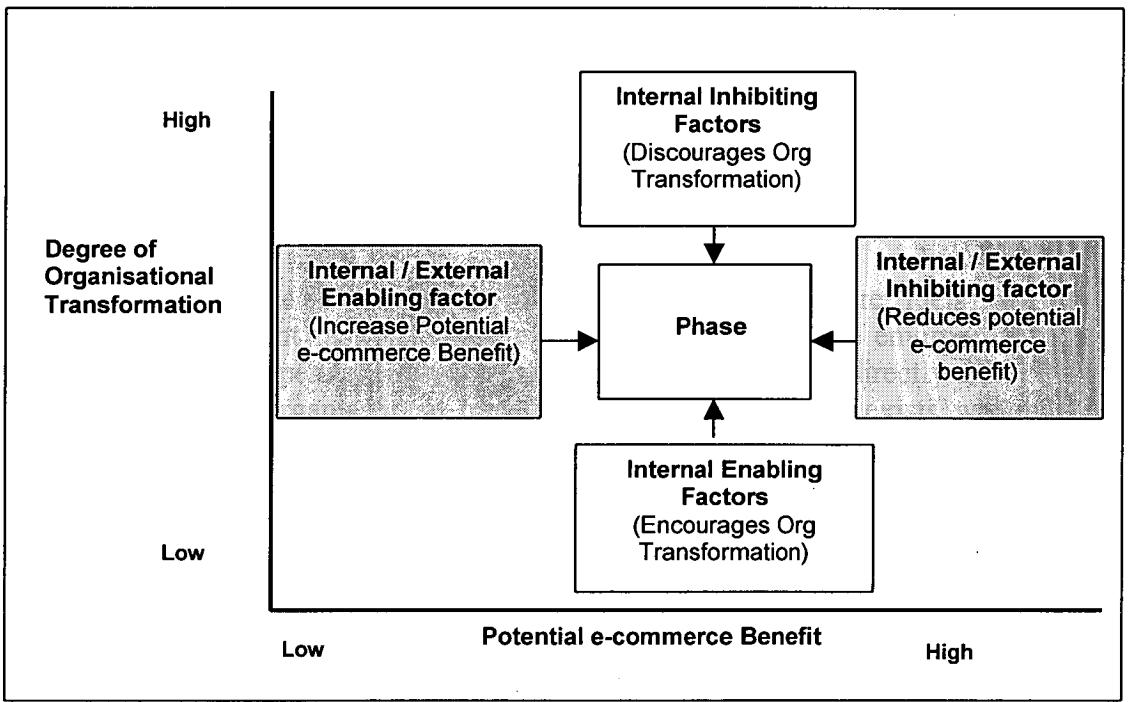

Figure 6-7. A Four Forces Model: Factors impacting on SME Organisational Transformation and Potential to derive E-Commerce Benefit.
Key → indicates the direction of the force being exerted.

6.7.1 Internal Forces

Where SMEs generate high levels of enabling forces derived from internal factors they exhibit an ability to engage in sophisticated levels of e-commerce business

[6] This work has been previously published by the author. Chau S.B. and Turner P. (2002a) "A Framework for Analysing Factors Influencing Small to Medium Sized Enterprises (SMEs) Ability to Derive Benefit from the Conduct of Web-based Electronic Commerce (EC)" *in Proceedings of the Xth European Conference on Information Systems*, Gdansk, Poland 6-8 June, 2002

transformation, thereby maximising their potential to derive e-commerce benefits. Where SMEs face strong inhibiting forces derived from internal factors the resultant potential to engage in e-commerce business transformation and potential to derive e-commerce benefit is significantly reduced. From the case studies it emerges that most SMEs exhibit a mix of enabling and inhibiting forces generated by technological and organisational factors. The ability to identify these forces however provides an opportunity to potentially change these internal factors to increase the potential of SMEs to optimise levels of e-commerce business transformation.

Table 6-10. E-Commerce Enabling / Inhibiting Forces generated by Internal Factors

Technology Enablers ▪ Sophisticated IT Infrastructure ▪ High level IT implementation and support skills ▪ An e-commerce application with scope to improve business value ▪ A conducive relationship with external service providers	Technology Inhibitors ▪ Lack of sophisticated IT Infrastructure ▪ Lack of IT expertise / skills ▪ An e-commerce application with limited e-commerce benefits ▪ Poor relationships with external service providers
Organisational Enablers ▪ Management Motivation ▪ Management Expertise ▪ Abundant resources (financial, personnel) ▪ Management support for e-commerce initiative	Organisational Inhibitors ▪ Lack of e-commerce strategic foresight ▪ Poor Leadership qualities ▪ Limited resources ▪ Half hearted support for e-commerce

6.7.2 External Forces

From the case studies it emerges that factors in the SMEs external business environment can have a major impact on their ability to derive benefits from e-commerce. In particular these forces generated by external factors can compound the influence of the internal factors identified above to either enhance or reduce the potential benefits of e-commerce. SMEs are rarely able to significantly alter these external factors or the impacts of the forces that these factors generate. Consequently, even where SMEs have engaged in high levels of e-commerce business transformation, the extent to which e-commerce benefits can be realised is heavily reliant on the external environment in which they operate.

Table 6-11. E-Commerce Enabling / Inhibiting Forces generated by External Factors

Environmental Enablers	Environmental Inhibitors
▪ Supply Chain Mechanisms ▪ Critical Mass of Suppliers ▪ Industry Support ▪ Government Assistance ▪ Supportive ISP	▪ Lack of Support from Government and Industry ▪ Archaic Trading Systems ▪ No Interest from Trading Agents ▪ No Champion to Implement Change ▪ Inability to exert automation of supply chain ▪ No incentives to automate the supply chain ▪ Problems with external service providers

6.8 The Four Phase Model of E-commerce Utilisation and Business Transformation[7]

With respect to the *Four Phase Model of E-Commerce Business Transformation* (Section 6.5) the interaction between enabling and inhibiting forces generated by internal and external factors can be seen to directly affect the position of the an SME within any phase. As Figure 6-7 illustrates, enabling internal/external forces, and inhibiting internal/external forces can increase or decrease respectively the potential of an SME to derive benefit from e-commerce in any phase, but only internal enabling/inhibiting forces are able to shift an SME between phases.

Figure 6-8 combines the extended four phase model of e-commerce business transformation (Figure 6-6) with the four forces model (Figure 6-7) to highlight the relationship between internal and external forces and the ability of SMEs to derive benefit from e-commerce activities. The dotted ovals surrounding each phase illustrates the potential influence of inhibiting internal/external forces and enabling external forces to significantly decrease/increase respectively the potential benefit SMEs derive from e-commerce in any phase. This model does not depict Internet start-up businesses that do not undergo a series of organisational transformations to acquire potential e-commerce benefit. Figure 6-6 illustrates the group of SMEs characterised as Internet start-up businesses.

[7] The author has presented a preliminary version of this model. Chau S.B. and Turner P. (2002a) "A Framework for Analysing Factors Influencing Small to Medium Sized Enterprises (SMEs) Ability to Derive Benefit from the Conduct of Web-based Electronic Commerce (EC)" *in Proceedings of the Xth European Conference on Information Systems*, Gdansk, Poland 6-8 June, 2002

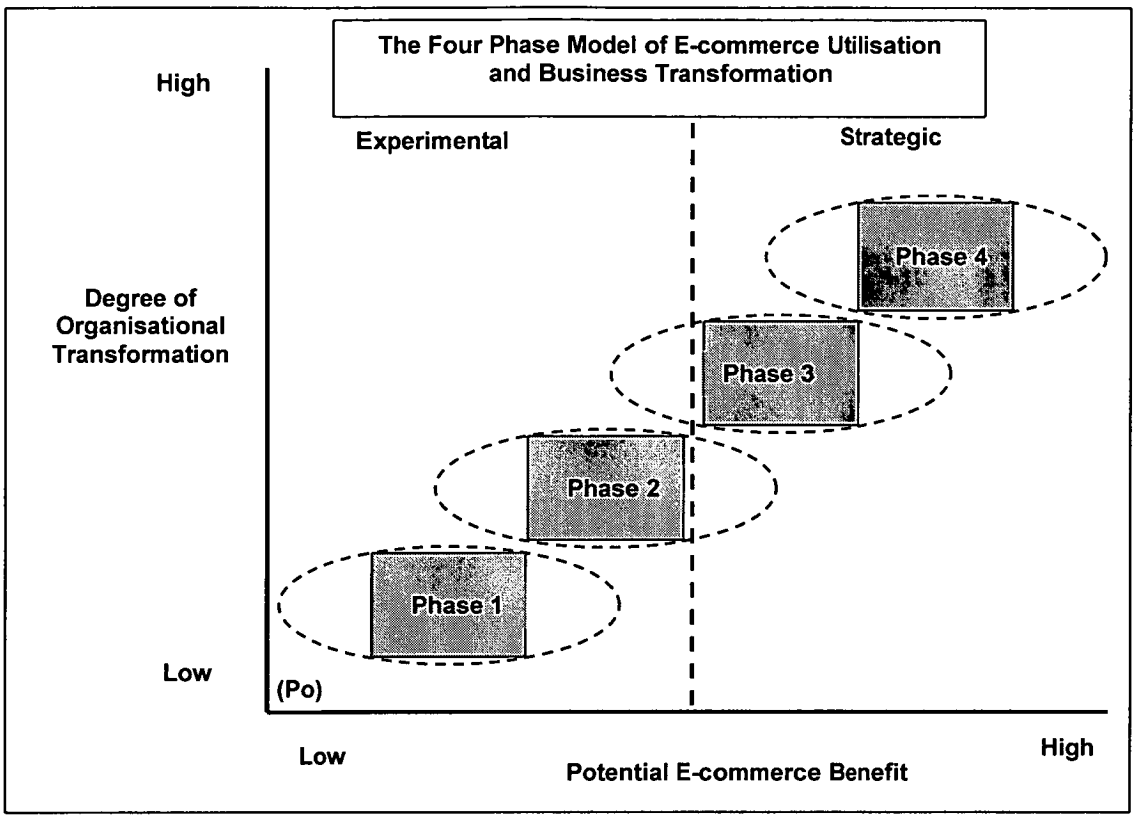

Figure 6-8. The Impact of Internal and External Forces on the potential E-Commerce Benefits across Four Phases.

Significantly in Phase 4 the ability to derive further marginal benefits from e-commerce via further organisational transformation is reduced because this phase depicts an optimised state of business transformation. In this phase, increases or decreases in the potential to derive further e-commerce benefit rely primarily on enabling/inhibiting forces generated by factors operating on the enterprise from the external environment. In Phases 1,2 and 3 the ability to derive further benefits from e-commerce through further degrees of organisational transformation remain significant. In these phases, forces operating on the enterprise from the external environment can further increase or decrease the potential to derive further e-commerce.

This research has developed a framework that identifies and critically analyses the range of factors impacting on the ability of SMEs to derive benefit from e-commerce. This framework has examined factors both internal and external to the business and has identified the interactive effect of enabling and inhibiting forces. Significantly this framework has highlighted that for SMEs the ability to derive benefits from e-commerce relies on internal forces where they have some control and external forces over which they have little control. This exploratory study provides an explanation as to why many SMEs who are relatively sophisticated users of e-commerce, have often found it difficult to derive significant benefits from e-commerce.

The *Four phase model of e-commerce utilisation and business transformation* reveals that there at least four phases of SME utilisation of e-commerce. These

phases emerge not as distinct stages of e-commerce adoption but rather as transitional states in the use of e-commerce where SMEs may establish themselves at directly or migrate to from other phases. By exploring the relationships between degrees of organisational transformation and potential benefits to be derived from e-commerce the model has illustrated that increased value from e-commerce accrues to those SMEs capable of re-aligning business structures and processes. From the case studies it also emerged that there are two distinct strategic perspectives adopted by SMEs in relation to the use of e-commerce: experimental and strategic. These insights enabled the model to be extended by overlaying these two stages to reveal the role of strategy in influencing the phase of e-commerce utilisation that SMEs occupy. While for many SMEs the utilisation of e-commerce remains experimental it is evident that the greatest potential benefits from e-commerce will only accrue when SMEs treat e-commerce as a strategic tool and engages in organisational transformation to leverage a relative advantage.

6.9 A Discussion of the Findings in Relation to the IS Literature

In this section the IS literature on SME e-commerce adoption and utilisation that has emerged since data collection is compared and contrasted with the findings and models developed in this thesis. This is a part of research methodology, which draws upon the inductive theory building approach described in Chapter 3 (Section 3.2.1.4). In Chapter 2 (Section 2.10) a brief discussion was presented review new research that has emerged since data collection. This section expands the brief review presented in Chapter 2. The focus of this section examines the emergent e-commerce models that particularly relate to the use of e-commerce among SMEs.

6.9.1 Post 2000 SME E-Commerce Adoption Literature

Research examining the adoption of e-commerce by SMEs still continues to attract IS interest particularly in certain industry sectors or specific SME areas (Daniel *et al.*, 2002). Ongoing e-commerce research is expanding to other areas relating to SMEs; the micro business group (Dandridge & Levenburg, 2000; Chau & Pedersen, 2000) and the use of change agents (Berranger & Tucker, 2000). Within Australia specific e-commerce research continues to explores specific industry sectors like the travel sector (Bull & Standing, 2000; Standing & Vasudavan, 2000) and rural sectors (Chambers & Parker, 2000).

Although it has been recognised that the SME uptake of Internet and e-commerce technologies lags behind larger organisations (Crawford, 1998) the interest in e-commerce adoption by SMEs continues into the new millennium. There still remains interest in factors affecting the adoption and barriers to the uptake of e-commerce (Moussi, 2000; Lawson *et al.*, 2001; Owens & Beynon-Davies, 2001; Ihlstrom & Nilsson, 2001; Levenburg *et al.*, 2002).

Levenburg *et al.* (2002) explores the adoption of Internet technologies based on perceptions of ease of use and usefulness among 300 small business that were actively using the Internet. The two variables, perceived ease of use and perceived usefulness, have in the past been found to influence technology adoption and usage (Davis, 1989; Davis, *et al.*, 1992). Based on data from 300 small businesses four performance outcomes were examined: increase sales; administrative costs;

reduced direct costs to create products or services; and increased profit. The majority of respondents indicated that they gained a perceived benefit from the use of the Internet. Firm's indicated a greater perceived usefulness exists when the Internet is used for marketing related purposes (eg., Web Site deployment, on-line advertising) as opposed to operational purposes (eg., finding new sources or supply) (Levenburg *et al.*, 2002:3). Their study found that SMEs are driven initially by ease of use considerations using simple Internet technologies like e-mail. As the usefulness of such technologies become apparent further more complex adoption of Internet technologies follow. Other researchers have suggested that the adoption of e-commerce is also related to the useability of a SMEs web site (Croll *et al.*, 2001).

However, in a survey of 100 SMEs, Steer *et al.*, (2000) conclude that the use of the Technology Acceptance Model (Davis, 1989) is not a suitable model for the exploring the issue of adoption in the web environment. These sentiments were also echoed in recent IS paper which provided a meta-analysis of TAM (Sharma & Yetton, 2001).

6.9.2 Models of E-Commerce Adoption and Utilisation

New literature has emerged proposing new models of e-commerce adoption and utilisation. Most of these models have been grounded and adapted from the literature of well established IS/IT models. However many of these models are formulated from a review of the available literature and need to be empirically tested and validated.

A conceptual model developed by Chambers and Parker (2000) extends the MICA model developed by Burgess and Cooper's (1999) by including motivating and inhibiting factors identified in the literature. Their model proposed that factors associated to the environment, individual, organisation, task and innovation contribute to the use of web commerce by small businesses.

An e-commerce business model comprising of eight component was proposed by Bull and Standing (2000). The researchers have extended aspects of several conventional business models to include other elements specific to e-commerce. The eight components in their e-business model comprise of:

- *Organisational Structure*: Flatter structure for faster decision making;
- *Management Style*: Less bureaucratic as information shared on Intranet;
- *Customer Service and Support*: On-line ordering and support systems;
- *Partners and alliances*: Extranet for supply chain management;
- *Personnel*: Job applications via Web, & expenses claims;
- *Marketing*: Internal and external marketing via Web;
- *Distribution*: Automatic order to distribution company;
- *Product or service*: Product related information shared quickly around organisation.

The researchers applied their conceptual e-commerce model with business models particular to the travel sector. They concede that a travel agency without a specialist niche market would gain little from an on-line presence however a virtual travel agency that can integrate e-commerce functionality through all business components have much to gain from an on-line channel (Bull &

Standing, 2000). The elements identified in Bull and Standing's model reflect several factors that have been identified in this research. Their research provides some valuable insight into a specific industry sector, the travel industry.

Based on the IS implementation literature and e-commerce and small business literature, Chong and Bauer (2000) proposed a conceptual e-commerce adoption and diffusion model of SME adopters and non-adopters. The model suggests that a range of internal and external factors influence the adoption of e-commerce by SMEs. Internal factors comprised of organisational, technological and communication factors while external factors included national and industry factors. To determine the significance of the factors a preliminary investigation involving four SMEs was initiated. The researchers suggest a range of internal and external issues derived from the literature were present amongst the business interviewed (Chong & Bauer, 2000:294). Within the internal environment *organisational factors* include;

- organisational structure
- firm size
- organisational culture
- organisational readiness
- management support to e-commerce adoption

the associated *technological factors* include:

- technical and organisational compatibility to adopt e-commerce
- perceived relative advantage of e-commerce
- observability of e-commerce advantages

and *communication factors*;

- information source
- communication channels
- communication frequency.

External environmental factors suggested by Chong and Bauer are segmented into national and industry factors. *National factors* include;

- cultural differences
- level of national infrastructure
- level of government involvement

and *industry factors*;

- competitive pressures
- pressure from trading partners
- critical mass.

Chong and Bauer's (2000) model is a conceptual model that requires empirical validation. These researchers aim to test the model with a survey of 150 SMEs in Australia and 50 SMEs in Singapore. The survey data will be supplemented with a detailed multiple case study of three enterprises. If the results validate Chong and Bauer's conceptual model it would provide an extra source of research that supports the numerous emergent factors identified in this study. Chong and Bauer (2000) acknowledge the affect of organisational and technological factors on technology adoption and diffusion supporting earlier research by Venkatraman (1994). It also emerged in this thesis that organisational and technological factors significantly influence the ability for businesses to conduct and derive e-commerce benefit.

Researched by Mehrtens *et al.* (2001) conducted a detailed investigation of seven SMEs to determine key factors that affect Internet adoption based on Iacovou's (1995) EDI adoption model. A range of factors emerged from their study that influences the adoption of the Internet. These factors were categorised into perceived benefits, organisational readiness and external pressure.

Their Internet adoption model (Mehrtens *et al.* 2000:171) defined these factors as:
Perceived benefits;

- Efficiency benefits from the relative advantage of the Internet over traditional methods (phone, fax, and post);
- An effective way for employees to gather information;
- A business tool to build the firm's image.

Organisational Readiness;

- Level of Internet knowledge among non-IT professionals, rather than IT Professionals;
- Adequate computer systems within the firm to access and use the Internet without major problems.

External Pressure;

- Pressure from existing Internet users, particularly customers, but also suppliers and potential employees, who expect the firm to be an Internet user and wanted them to communicate electronically.

Mehrten's model differs from other Internet small business models by referring to more than the just the benefits from Internet e-commerce. The researchers also noted similarities between Internet adoption and EDI adoption however the definition of factors; organisational readiness and external pressure were substantially different. In Iacovou's (1995) model financial resources were highlighted as a notable factor in the adoption of EDI however this was not supported by Mehrtens *et al.* The factors identified by Mehrtens *et al.* (2000) compares closely with factors that have emerged in this research. The internal and external factors that have emerged in this thesis are closely associated with various aspects of Mehrtens *et al.* (2000) research.

6.9.3 E-Commerce Maturity Models

The *Stages of Growth for e-Business* model developed by McKay *et al.,* (2000; 2001) is a combined approach of an extended e-commerce staged maturity model based on KPMG's E-Commerce Maturity Model and the IT maturity model outlined by Galliers & Sutherland (1994). The model developed by McKay *et al.* has not been formulated to be specifically applicable to SMEs involved with e-commerce utilisation.

The model suggests that as the organisation's sophistication of e-commerce and IT matures the chance of reaching electronic business maturity increase. Optimal electronic business maturity exists when the evolutionary pathways of integrating IT/IS and Internet Commerce within the organisation are combined. The authors of this model acknowledge that the rate of e-commerce and IT sophistication can vary along each pathway at each instance in time.

One limitation of this model is that it suggests the most mature stage of electronic business occurs when both the levels of e-commerce and IT have achieved a high

degree of maturity. In reality some businesses may find the greatest benefits from e-commerce are attained through a basic utilisation of e-commerce even though they possess a highly sophisticated level of IT maturity. Also the model does not take into account the various external factors that can directly affect the ability for organisations to reach e-business maturity. The model also assumes that IT/IS activities are separate from e-commerce/IC activities. However in reality, the evolution of one pathway can directly effect the evolution of the other. Finally the model assumes that organisations take a staged approach to conducting IS/IT and e-commerce activities.

In the development of McKay *et al.*, (2000) model a conceptual pathway of Internet commerce maturity is proposed. Their model outlines six stages of Internet Commerce Maturity (ICM) starting from no presence through to external integration. These six stages in order of low IC maturity to high IC maturity are:

- Stage 1: no presence,
- Stage 2: static on-line presence
- Stage 3: interactive on-line presence
- Stage 4: Internet commerce
- Stage 5: internal integration
- Stage 6: external integration

Although the model proposed by McKay *et al.*, needs empirical validation, the stages proposed in their research follow similarities to the four phases of e-commerce utilisation that emerged in this study.

A comparison of McKay's ICM model with the *Four Phase Model of E-Commerce Utilisation* reveals several stages found in the ICM model reflect characteristics of the phases outlined in the four phase model (see section 6.3). For example, Phase 1 in the four phase model would encompass e-commerce activities found in Stage 2 and Stage 3 of the ICM model. Phase 3 in the four phase model can include Stages 3,4,5 of the ICM model. The research conducted in this thesis has found that SMEs do not necessarily progress through a set of determinate stages but may start their e-commerce initiatives at any one of the stages proposed in the ICM model. Case R and Case S included in this study integrated e-commerce activities into business processes as part of the initial e-commerce initiatives with out proceeding through a set of stages outlined in the ICM model.

Recent IS research by Levi and Powell (2002) indicate that SMEs do not necessarily follow a single IS transformation path in relation to e-business transformation models but may take alternative business transformation pathways in relation to e-business activities. Levi and Powell adapted Venkatraman's (1994) classic transformation model (See Section 6.5, Figure 6-4) exploring SME transformation among 41 cases. Their analysis of the SME's e-business organisational transformation was categorised into four distinct transformations. The first two pathways reflect the organisational transformation pathways described by Venkatraman (1994) and are considered by Levi and Powell as *proscribed* path to e-business transformation.

- The first path found SMEs limited to the localised exploitation of e-commerce with no desire to progress beyond this approach.
- The second path highlighted by Levi and Powell found SMEs migrating through a localised exploitation stage followed by internal integration outlined in Venkatraman's (1994) model. Although the SMEs following the second path were attracted to e-commerce to reduce costs and increased efficiency, there was little evidence of organisational change. This advocates the distinction between Phase 2 and Phase 3 businesses identified in the four phases of e-commerce utilisation acknowledged in the this thesis (See Section 6.3).

Levi and Powell observed other SMEs follow a different *disjointed* or *disconnected* pathway from later phases of Venkatraman's model. The *disconnected* pathway was described where SMEs engaged in information and communication technologies but did little to alter existing business processes These SMEs proceeded to manually re-enter e-commerce data into existing internal systems. "Only once the firm realises there is a benefit to internal systems improvement that they revisited internal integration" (Levi and Powell (2002:681). This observation was also reflected by SMEs in this study located in Phase 2 (Section 6.3.2).

Innovative SMEs that followed the path through localised exploitation, internal integration but they jump directly to business scope redefinition before employing business network redesign or business process redesign. The influence of innovative management and customer pressure may entice SMEs to redesign their whole business direction as a result of maximising the potential of e-business and strategic use of information. Levi and Powell describe this track as a *disjointed* pathway.

The three types of organisational transformations described by Levi and Powell are reflected in the *Four Phase Model of E-commerce Business Transformation* developed in this thesis. The *proscribed* pathway described by Levi and Powell can be depicted in this study by e-commerce characteristics of SMEs found in Phases 1 and 2 (See Section 6.3). The *disconnected* pathway identified by Levi and Powell described those SMEs predominantly in Phase 2 (See Section 6.3.2), which utilised various forms of ICTs without significantly altering existing business processes. Once these SMEs acquired real benefit from their introduction into e-commerce they may move to Phase 3 (See Section 6.3.3). The *disjointed* pathway described by Levi and Powell describes those SMEs that start their e-commerce experience at Phase 1 or Phase 2 and then realised an significant opportunity and migrate directly to Phase 4 (See Section 6.3.4).

Levi and Powell suggest that future research is required to identifying enablers and inhibitors of e-business adoption for SMEs. It is hoped that the *Revised Four Phase Model of E-Commerce Business Transformation* developed in this thesis can contribute to future research in this area by aims to taking into account internal and external factors that can enable or inhibit the ability of SMEs to conduct transformation.

6.10 A Summary Reflection of this Chapter.

This chapter has interpreted and discussed the analysis of the data combining the principles of grounded theory and domain analysis. The interpretation of the data identifies at least six key areas of e-commerce utilisation among thirty-four Australian SMEs. The utilisation of e-commerce can be characterised by two approaches. SMEs reflect either an experimental or strategic approach to the use of e-commerce. Experimental users may take on a strategic approach to using e-commerce if the appropriate resources and value proposition arises (Section 6.2).

An *initial* four phase model of e-commerce utilisation is developed to distinguish four phases of e-commerce utilisation. These phases consist of a static web presence, an adjunct to traditional business, re-engineering of business processes and virtual business structures (Section 6.3). The first two phases of the model characterise an experimental approach to e-commerce while the last two phases exhibit a strategic direction with the use of e-commerce.

The level of e-commerce benefit derived from integrating e-commerce into existing business processes is explored by investigating the relationship between the level of organisational transformation and the potential for e-commerce benefit. The development of a four phase model of e-commerce business transformation depicts the relationship between the level of organisational transformation and the potential for e-commerce benefit from the analysis of the SMEs included in this study (Section 6.5). A range of factors internal and external to the organisation has been discussed in this chapter which directly or indirectly affects the ability of SMEs to conduct e-commerce. The nature and impact of these factors are depicted in the four forces model which illustrated the relative effect of the factors on each phase of e-commerce utilisation (Section 6.7).

Combining the relative merits from each of the three initial models a *Four Phase Model of E-Commerce Utilisation and Business Transformation* is developed (Section 6.8). This model reflects the four phases or e-commerce utilisation, the relationship between the degree of organisational transformation and potential e-commerce benefit. The relative influences of internal and external factors that can affect the ability of the SMEs to conduct e-commerce are also depicted in the model.

The models developed in this chapter are discussed in comparison with emergent IS literature that is related to the utilisation of e-commerce by SMEs. Other researchers have discussed the factors that affect the adoption of e-commerce but few studies that have been empirically tested, and have examined the factors affecting the utilisation of e-commerce (See Section 2.8). A number of stage models of e-commerce maturity have been cited that reflects an incremental staged approach to e-commerce sophistication (See Section 2.9 and Section 6.9.3). This study differs, observing SMEs starting their e-commerce activities at anyone one of four phases discussed in this chapter (Section 6.3). Other researchers have reported the potential benefits from e-commerce business transformation but few have acknowledged the range of factors that also contribute to the ability of SMEs to conduct e-commerce. In the next chapter the conclusions of the study and future areas of research are discussed along with the research limitations of this thesis.

7. CONCLUSIONS & FUTURE WORK

7.0 Introduction

This thesis concludes by providing a brief summary of the major findings. This chapter discusses the contributions this thesis makes to the IS discipline and implications for SMEs conducting e-commerce. This chapter also includes a section on the limitations of this study and suggested areas of future work.

This thesis addresses two research questions (See Section 1.2.2):

- What is a suitable framework to explore the utilisation of electronic commerce amongst SMEs in Australia?

- What factors influence the utilisation of electronic commerce amongst Australian SMEs?

7.1 Summary of Findings

7.1.1 The utilisation of e-commerce among Australian SMEs

An analysis of thirty-four case studies revealed a broad range of e-commerce activities. The utilisation of e-commerce can be distinguished into six major e-commerce activities (See Section 6.1.1). These include:

- electronic banking,
- communications internally and externally to the business,
- a means to reduce costs,
- sales and marketing,
- enhancing business processes and
- enhancing customer service.

The sophistication of e-commerce utilisation varied across the range of SMEs depending on the calibre and mix of the e-commerce activities. Although it has been reported by other researchers that significant benefits can be reaped from using e-commerce/Internet for forming collaborative links and alliances. None of the case studies included in this study specifically used e-commerce to foster strategic alliances except in cases that were directly associated with the ICT industry (See Section 6.6.2).

Four Phases of E-Commerce Utilisation

The analysis of the data reveals that use of web-based e-commerce amongst the thirty-four SMEs can be distinguished by four phases (See Section 6.3).

- Phase 1 depicts those SMEs that wish to primarily gain an on-line presence.
- Phase 2 depicts established SMEs that wish to explore the opportunities of the on-line environment with minimal impact on their conventional traditional trading practices. These businesses tend to run their e-commerce applications in parallel with conventional business processes without any integration between the two.
- Phase 3 SMEs are indicative of those businesses that have identified strategic value for using e-commerce and are prepared to significantly alter their

business processed to accommodate and integrate e-commerce technologies and strategies.

- Phase 4 SMEs represent those businesses where the use of e-commerce is central to their business survival. These businesses trade exclusively on-line and leverage the relative merits of e-commerce and the Internet to conduct their business.

This research has found individual businesses can establish themselves at any one of the four phases without necessarily progressing through any prior phase. The SMEs may establish themselves at advanced phases without having to proceed through lower phases. Similarly an organisation initially categorised in Phase 1, may proceed directly to Phase 3 or Phase 4 without ever exhibiting Phase 2 characteristics.

Although no businesses were found to move from a high Phase to a lower Phase some Phase 4 businesses indicated they might consider moving to a Phase 3 scenario if their business expanded. These businesses would require extra staff and physically storage space if their business continued to grow.

Virtual Organisations

The development of the Four Phase Model distinguishes one particular group of SMEs that trade exclusively on-line (See Section 6.2.3). The SMEs located in Phase 4 are categorised as possessing a virtual business structure. These virtual small businesses (VSBs) rely solely on the on-line environment for their well being and livelihood. In many cases these organisations can be considered to be operating as virtual organisations however these virtual small businesses differ from conventional virtual organisations in that they are not necessarily engaged in formal business alliances or virtual networks. Although some of the businesses are characterise an Internet start-up business, several VSBs represent separate new entities established by parent organisations, which continue to trade in a conventional method. These businesses are developed with the sole intent of trading in a virtual manner leveraging the full advantages of the on-line environment.

This thesis makes a contribution to the IS discipline by acknowledging a group of businesses that operate as virtual small businesses (Section 6.2.3). The thesis distinguishes three dimensions of virtual small businesses (Figure 6-1). The first group of virtual businesses reflects those small businesses that are actively engaged in conventional strategic alliances and collaboration to gain a level of virtual-ness. A second group of virtual businesses represents "Dot.com" businesses that trade exclusively on-line and rely totally on e-commerce and the Internet for their business survival. These businesses have no prior business history or value proposition. The analysis of the data identifies a third group of virtual small businesses that do not necessarily rely on collaborative or strategic alliances to conduct their business. These businesses undergo significant organisational transformation to acquire virtual traits of a virtual business. The businesses have an established value proposition that has been adopted from conventional business practices. The use of e-commerce and the Internet is an integral part of their business structure.

E-Commerce sophistication is not related to business size
The analysis of the thirty-four businesses found that the degree of e-commerce sophistication is not related to the size of the SME. Drawing upon the four phases of e-commerce identified in this study it was evident that medium sized enterprises did not necessarily embark on complex e-commerce installations initially. All types of SMEs were represented in Phase 1 that characterised SMEs wanting just a static presence. Micro, small and medium sized businesses were also found to exist in Phase 2 however the more sophisticated users of e-commerce (Phase 3) emphasising a strategic approach to using e-commerce was predominantly categorised small and medium sized businesses. The only micro businesses in this category were advanced IT/EC business users associated with the ICT industry. In this study, only micro businesses were found to exist in Phase 4.

Two Strategic Approaches to the Utilisation of E-Commerce among SMEs
The analysis of how e-commerce is used by the case studies reflects two management approaches (See Section 6.2). There are those businesses where the management wishes to experiment with e-commerce technologies and have no intent on changing underlying business processes. Alternatively there exists other organisations that possess a clear strategic direction to incorporate e-commerce within their business operations, where changes to the existing organisational structure and business processes are possible. With respect to the four phase model SMEs located in Phases 1 and Phase 2 typically exhibit an experimental approach to the use of e-commerce. The e-commerce initiatives by experimental users of e-commerce do not fundamentally change business processes. Typically any orders or sales acquired from e-commerce activities are manually re-entered into their conventional transaction systems. In Phase 3 and Phase 4 the introduction of e-commerce by SMEs takes on a more strategic outlook. Phase 3 and Phase 4 organisations tend to discuss e-commerce developments with suppliers, customers and other business associates so that every avenue for potential e-commerce benefit can be explored. Organisation's that possess a strategic focus for e-commerce are prepared to change and integrate e-commerce into existing business processes internally and externally to maximise their return from e-commerce.

Organisational Transformation and E-Commerce
The IT enabled business transformation framework proposed by Venkatraman (1994) depicts the relationship between IT enabled business transformation and the ability for organisations to gain potential IT benefits. The analysis of the case study participants supports the view that increase levels of organisational transformation associated to e-commerce can lead to increase potential benefits derived from e-commerce. The four phase model developed in this thesis acknowledges the relationship between the degree of organisational change and the potential benefits derived from e-commerce (See Section 6.5).

If an organisation has the ability and desire to conduct e-commerce based organisational transformation the potential gains attributed to e-commerce increase. If an organisation incorporates e-commerce with limited changes to traditional business practices then the potential to derive e-commerce benefit is confined. The most benefits from e-commerce can be attained where there is a

seamless integration of e-commerce applications into information systems infrastructures.

7.1.2 Factors that influence the utilisation of e-commerce by Australian SMEs

The ability of SMEs to derive benefits from e-commerce is dependent on the business, management and trading environment in which the business operates. Factors internally and externally to the business can directly or indirectly influence the ability of SMEs to acquire benefit from e-commerce (See Section 6.6).

The influence of industry, external e-commerce service providers, government support and nature of the supply chain are all external factors which the organisation has little control of but collectively these factors can significantly influence the potential for SMEs to derive benefit from e-commerce (See Section 6.6.2).

In contrast, SMEs have a greater control over internal factors (See Section 6.6.1). The motivation, support and organisational skills of management significantly affect the utilisation e-commerce. The amount of technological and financial resources allocated to develop, implement and support e-commerce applications and the provision of suitable IT infrastructure to sustain e-commerce initiatives will determine the capacity of organisations to conduct e-commerce. The relative mix of these combined internal and external factors will have a deterministic power to ascertain the ability of SMEs to acquire benefit from e-commerce.

The analysis of the data suggests these internal and external factors also affect the ability of SMEs to conduct e-commerce based organisation transformation and acquire potential e-commerce benefit. The organisation may have the ability to control some of these factors however there are other factors that are beyond the power of the individual SMEs. The balance between those factors that can either positively influence the organisation or inhibit the ability of organisations to derive benefit will ultimately determine the relative success of the organisation's capacity to incorporate e-commerce.

7.2 Contribution to the IS Discipline

This thesis makes a contribution to the field of Information Systems at substantive, methodological and theoretical level.

- At a substantive level the thesis examines thirty-four SMEs engaged in e-commerce representing a cross section of nine industries from two States in Australia (Section 3.3.4.2). Micro, small and medium sized businesses were explored. These SMEs are representative of a broad range of industry sectors that include, agriculture, education, finance, hospitality, ICT, manufacturing, mining, retail and wholesale trade. This represents several industry sectors where there exists a high likelihood for the active use of e-commerce by SMEs (Australian Bureau of Statistics, 1999).
- At a methodological level the thesis combines two analytical techniques (Section 3.4.1), using a high level grounded theory coding procedure complemented by the use of domain analysis to extract the rich inter-relationships between themes. A set of open, axial and selective coding

procedures based on the principles of grounded theory was applied to each individual case study (Section 3.4.3.1). The coding practices revealed an emergent set of concepts and themes. To explore these concepts and themes in greater depth across all cases a domain analysis approach was used to examine in detail the inter-relationships and semantic characteristics within and between the core codes. The rich information gained in the data analysis was used to develop a set of models that explore the utilisation of e-commerce among a group of Australian SMEs.

- At the theoretical level, the thesis presents a set of heuristic models that identify the various use of e-commerce amongst SMEs and an exploration of the inter-relationships between the themes that emerge from the data. An *initial Four phase model of e-commerce utilisation* (Section 6.3) was developed portraying an array of e-commerce activities. The analysis of the data revealed that business owner/managers approached their use of e-commerce with either an experimental or strategic orientation. The data analysis also revealed that there exists a relationship between the degree of e-commerce organisational transformation and potential e-commerce benefit. Taking into account this relationship and extending the initial model a *Four phase model of e-commerce business transformation* was developed (Section 6.5). Further analysis of the data suggested that a range of factors influence the ability of SMEs to conduct e-commerce. Consequently, A revised model was developed acknowledging these internal and external e-commerce factors. This revised model was called the *Four phase model of e-commerce utilisation and business transformation* (Section 6.8).

7.3 Recommendations for SMEs engaging in web based e-commerce.

- First and foremost it is essential for businesses to determine if there exists a value proposition for the use of e-commerce within the organisation and externally with business partners, associates and customers. The owner/managers need to decide if they wish to use e-commerce experimentally or strategically. To gain the most from e-commerce a strategic approach requires a judgment on the level of e-commerce integration into existing business processes. This may be based on a number of factors internal and external to the business.

- This research acknowledges there is a range of internal and external factors that can directly or indirectly influence the ability of SMEs to incorporate and utilise e-commerce. Some of the factors are controllable to some extent by the business but many factors are beyond the control of individual businesses. The owners/managers of SMEs possess the ability to outline their e-commerce strategy to some degree, determining how much financial, technical and organisational resources to allocate to an e-commerce system however the business also needs to analyse the external environment in which they wish to operate in. The influence of government policy, industry support, e-commerce standards and more importantly the critical mass, e-commerce capacity and e-commerce ability of e-commerce clients and suppliers are paramount. A

balanced approach exploring issues internal and external to the business is required to ensure a successful e-commerce implementation.

- The potential benefits derived from e-commerce may not necessarily lead to relative advantage in real terms. E-commerce may not bring increase real benefits for some SMEs. To gain the most from e-commerce it is essential that business owners/managers gain a thorough understanding and knowledge of e-commerce. With this knowledge business owners/managers can be in a position to make an informed decision about the use of e-commerce and can plan the incorporation of new emergent technologies. SMEs that are an established business entity with a dedicated group of customers and suppliers are at a distinct advantage. The ability to direct liase with potential e-commerce clients in the design and development of their e-commerce applications increases the relative success and acceptance of e-commerce initiatives. E-commerce has the potential to provide added benefits for a significant number of SMEs however there exists a range of issues that may reduce these potential benefits.

- An essential part of utilising e-commerce is to determine the motivation, enthusiasm and e-commerce capabilities of existing clients and suppliers. SMEs conducting business to business e-commerce need to ensure that trading partners possess the ability and desire to trade electronically using standard e-commerce technologies that are accessible to all businesses concerned. The SMEs that utilise e-commerce for business to consumer type transactions need to ascertain the potential on-line market place and their ability to attract and retain new and existing customers. If part of the e-commerce strategy is to conduct e-commerce with an existing customer base the business needs to ensure that the customer base desires e-commerce as an alternative trading platform and more importantly has the capacity to conduct e-commerce.

- Owners/managers need to determine the available e-commerce skills, organisational resources, and technical capability to design, develop, implement and support any e-commerce activity. In this research 50% of the SMEs had either acquired (i.e taught themselves) the necessary e-commerce development skills to create their e-commerce systems internally or utilised friends and family to establish their e-commerce platform for little or no cost. It is doubtful that many of these SMEs would have utilised e-commerce if they had to pay for professional web developers. The ability to design, develop and implement an e-commerce system in-house also offsets the potential problems associated with external service providers during the development phase.

- Most importantly, the decision to initiate e-commerce requires a commitment from the owner/managers of the business to fully support, the development, incorporation and ongoing maintenance of any e-commerce application. The owners/managers of all the SMEs included in this study were highly motivated and enthusiastic about the use of e-commerce. The support and willingness of key management to take an active role in the design, development and implementation of e-commerce can significantly increase the chance for a successful utilisation of e-commerce.

7.4 Limitations of the Study

7.4.1 Scope of the research

- This thesis only examined a small number of SMEs in two regional areas in Australia. The research is of an exploratory nature the scope of the research aimed to gather as much insight into a cross section of SMEs from a range of industry sectors. Interviews with thirty-four individual SMEs enabled the researcher to gather sufficient data to develop models of e-commerce utilisation among SMEs. It is envisaged that this research provides a foundation for subsequent SME e-commerce research in the future, which may focus on particular types of SMEs or aspects of an SME business.

- This research is not a longitudinal study and only provides a snapshot of the current activities of a selection of SMEs. Generally each SME was interviewed only once. Follow up phone calls were occasionally made to clarify any particular points of the interview. At the time the interviews were conducted two exceptional factors may have influenced the ability for SMEs to undertake any new technology innovation. Firstly, some of the interviews were conducted in the year prior to the new millennium. The influence of media and government issued warnings to SMEs to prepare for the effects of the 'millennium bug' may have affected the ability of SMEs to conduct e-commerce related activities. Similarly, the Australian government introduced a goods and services tax (2000) in July 2000. This required many SMEs to upgrade their accounting systems to cope with the new tax laws. The combined affect of these two issues may directly or indirectly influence the ability of SMEs to utilise e-commerce.

- This research aimed to gather details from a broad range of SMEs from a range of industry sectors. No particular industry comparisons were made among the SMEs included in this study. This could form part of future research endeavours.

7.4.2 Limitations of the Multiple Case Study Research

There exists a range of limitations intrinsic to a case study research approach. The data collection and analysis can be influenced by the researcher's interpretation of the events, interviews and documents collected (Galliers, 1992). The researcher's background and experiences can also affect the process of interpretation of the data (Yin, 1984). Analysis of qualitative data is a time consuming process especially when there is only one researcher. The sheer volume of data collected can make the analysis of the data a tedious event (Darke *et al.* 1996).

Limitations of case study research may also stem from the scope of the research. As this study is undertaken by a researcher as a requirement for fulfilment of a doctoral thesis, the amount of time and resources available is finite. The amount of funding allocated to the data collection is a limitation to the study. With the vast amount of data collected, the time to analyse and interpret the data could be indefinite. Fortunately the temporal boundaries of the research is predetermined and bound by the rules and guidelines set by the research institution overseeing this study.

The lack of generalisability and possible research bias are possibly the greatest limitations to this research. It has been cited in the literature Clayton (1997) that case study research lacks generalisability, as it is not representative of general group or population. Although the research methods used in this study may lack some degree of generalisability the level of generality is increased by incorporating over thirty case studies. Where "generality refers to the range of phenomena across which the theory had been demonstrated to hold" (Baskerville & Lee, 1999).

Research bias may be apparent in a number of areas. These include bias stemming from the researcher, the informant and possible the agency where the research was conducted. Information given by the informant may be retrospective and often involve recollections of past events. This highlights the potential problems inherent with memory.

Case Study Bias
Biases are unavoidable in case study research. The influence of the researcher conducting the research creates a bias when data collection is in progress. Prior assumptions and views about the research context can influence the analysis. The participant's reaction to the interviewee and interview process can cultivate various biases. The length of the interview, the emotional status of the interviewee, the type of questions and the interview setting can all contribute to possible research biases. To overcome this bias the researcher endeavoured to collect case data from multiple sources of evidence. Using multiple sources of data from different sources helps reduce the problem of potential research bias (Miles & Huberman 1984). The recruitment process exposed very little bias other than the SMEs deciding to become apart of the research.

Rigour and Validity
The research methodology requires the researcher to instil rigour and validity at all stages of the study. A detailed description of how the results were established aids in establishing validity. Rigour and reliability is illustrated by providing evidence of the research outcomes. A detailed discussion of the approach utilised to conduct this research is presented in this thesis. The process by which the research outcomes have been formulated and an outline of how these outcomes were gathered aids in ensuring rigour in this research.

To increase rigour and validity within this research SMEs were interviewed from two states in Australia, Tasmania and Western Australia. This was to ensure that the emergent themes gathered in the data analysis was not localised to one particular geographical area. By including the analysis of data from thirty-four individual case studies the level of rigour and validity in this research is also increased. Finally key elements of this research have been peered reviewed by independent academics in three continents. The researcher has published major elements of this thesis in publications in North America, Europe and Australia.

Generality
The use of case study research has been criticised for its perceived lack of generality. The intention of using case studies is not to derive inferences about a

large population but to generalise back to theory. The case studies presented in this research are only a very small snapshot of the SMEs utilising e-commerce. The question arises how applicable is this research to other SMEs incorporating e-commerce in Australia and beyond. The data gathered in this thesis does limit the generalisability of the findings because the research only included SMEs with positive levels of e-commerce utilisation however in addition to gaining thirty-four SMEs that was representative of micro, small and medium sized enterprises, the SMEs were representative of a range of:

- business-to-business and business-to-consumer traders,
- local, national and international traders,
- product and service providers and,
- traders from two independent States in Australia.

The researcher therefore believes that the findings from this research can be generalised to the wider groups of SMEs.

Drawing out the links between individuals actions in utilising electronic commerce and the wider socio-economic context enables a more comprehensive analysis "While research data are often mainly gathered at either a structural or at an interactional level, sound analysis and intelligent conceptualisation requires that both levels (and their relations) should be addressed" (Silverman:1985:70). Ultimately generality is assured as the methodology employed by the research to derive the findings leads to a "naturalistic generalisation" of the findings.

7.5 Future Research

This thesis has provided an exploratory study on the utilisation of e-commerce by a range of SMEs. The study provides several conceptual e-commerce models at the theoretical level.

It is envisaged that future work will expand upon this exploratory research to investigate in detail various components of this thesis. Suggested future work may involve the extending the Four Phases model to include a wider scope of SMEs differentiated by a broader range of industry sectors.

Future extensions of the Four Phase Model may explore its application to specific e-commerce niches e.g. business-to-business, business-to-consumer and also introduce factors including degree of e-commerce investment and existing IT/e-commerce capabilities.

A further exploration of apparent factors that affect the development, implementation and support of e-commerce systems by SMEs would be of interest. The duration of this study was finite, each interview only provided a snapshot of the organisation's position of e-commerce utilisation. The ability to investigate if and how organisations change their utilisation of e-commerce over time would provide another worthwhile dimension into this research area.

This study has focused on the views of those SMEs actively utilising e-commerce. Consequently, the findings in this research reflect the views of active adopters of e-commerce. The views of those businesses that are not utilising e-commerce but

are intending to will need to be explored in further research to provide a more complete view of e-commerce utilisation by SMEs.

Given the exploratory nature of this research it is acknowledged that there may well be other factors that impact on the utilisation of e-commerce among SMEs. An investigation for additional attributes would form the basis for future research. Further research is required to explore the interaction between business attributes and the relative success of e-commerce utilisation. Other attributes such as the nature of the client, supply chain management and customer relationship management could be investigated and reported upon in future work.

These are just some of the potential areas for future researchers in this highly evolving but important research area. Despite the exploratory nature of this model it is anticipated that it will make a valuable contribution as a base for future research in this area.

7.6 Concluding Reflections

In conclusion this thesis aims to broaden the knowledge, understanding and theory in regard to the utilisation of e-commerce among SMEs. The thesis has provided a substantive, methodological and theoretical contribution to the IS discipline. The researcher hopes that aspects of this thesis will be helpful for those SMEs and practitioners that are actively considering or utilising e-commerce. One of the greatest joys associated with this study has been the interest displayed from other academics and practitioners with the research findings. The knowledge that this thesis has generated and encouraged further interest in SME e-commerce research by other academics and practitioners provides immense satisfaction.

The volume of e-commerce research continues grow however in Australia there still remains a limited amount of substantive IS theory that demonstrates a high level of rigour and validity concerning the use of e-commerce by SMEs. This thesis aims to provide a foundation for future works in this most important research area. It is hoped that this research will encourage other researchers to continue advancing the knowledge and understanding surrounding the utilisation of e-commerce among SMEs.

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Appendix One: Domain Analysis Worksheets

Domain Analysis Worksheet: Case X

	Ref	Included Terms	Semantic Relationship	Domain
Case X	T1	Concept for business developed in April 1998	*is a part of*	Business Background
Case X	T1	Educational resources	*is a characteristic of*	Business Background
Case X	T1	Management developed strategy	*is a part of*	Business Background
Case X	T1	Use Internet to sell directly	*is a is a characteristic of*	Business Background
Case X	T1	Experiment with Internet technology	*is a part of*	Business Background
Case X	T2	Minimise production costs	*is a reason for*	EC Strategy
Case X	T2	Increase product range	*is a part of*	EC Strategy
Case X	T2	Product customisation	*is a characteristic of*	EC Strategy
Case X	T2	Cost benefit for customer	*is a reason for*	EC Strategy
Case X	T3	Downloadable educational resources	*is a characteristic of*	EC Benefit
Case X	T3	Flexibility	*is a reason for*	EC Benefit
Case X	T3	Increase choice	*is a reason for*	EC Benefit
Case X	T3	Convenience	*is a reason for*	EC Benefit
Case X	T3	Instant access	*is a reason for*	EC Benefit
Case X	T4	Business Partner	*is a cause for*	EC Driver
Case X	T4	This business evolved from existing business	*is a part of*	EC Driver
Case X	T4	Increase Market Share	*is a reason for*	EC Driver
Case X	T5	Digitise existing product	*is a part of*	EC Application
Case X	T6	Provide credit for product	*is a part of*	EC Strategy
Case X	T6	Rely on trust	*is a part of*	EC Strategy
Case X	T7	The product database is already in electronic format	*is a characteristic of*	EC Application
Case X	T8	Create new entity	*is a stage of*	EC Strategy
Case X	T8	Take a retail approach	*is a part of*	EC Strategy
Case X	T8	Encourage content providers	*is a stage of*	EC Strategy
Case X	T9	British content provider	*is a kind of*	Strategic Alliance
Case X	T9	Attract interest for collaboration	*is a part of*	Strategic Alliance
Case X	T9	No alliances yet	*is a part of*	Strategic Alliance
Case X	T10	Too costly for little benefit	*is a result of*	Cost Benefit
Case X	T11	Internet uptake is slow	*is a characteristic of*	Internet
Case X	T11	Australia lags behind	*is a characteristic of*	Internet
Case X	T11	Too slow	*is a characteristic of*	Internet
Case X	T11	Too complex	*is a characteristic of*	Internet

Domain Analysis Worksheet: Case X

	Ref	Included Terms	Semantic Relationship	Domain
Case X	T12	Business Partner	*is a reason for*	EC Driver
Case X	T13	Technology aware	*is a characteristic of*	Management
Case X	T13	member of school staff previously	*is a characteristic of*	Management
Case X	T13	Previous experience with web business	*is a characteristic of*	Management
Case X	T13	Business idea from a competitor	*is a part of*	Management
Case X	T14	Age 4 months	*is a characteristic of*	Web Site Development
Case X	T14	Student programmer	*is a cause for*	Web Site Development
Case X	T14	Programmer is related to family	*is a part of*	Web Site Development
Case X	T14	Low cost programming rates	*is a reason for*	Web Site Development
Case X	T15	ISP hosted	*is a part of*	Web Site
Case X	T15	provide micro payment system	*is a part of*	Web Site
Case X	T16	Initially provide credit	*is a part of*	Electronic Payment Systems
Case X	T16	provide customer accounts	*is a part of*	Electronic Payment Systems
Case X	T16	e-commerce application monitors accounts	*is a part of*	Electronic Payment Systems
Case X	T17	UK	*is a part of*	Regional Offices
Case X	T17	Marketing problem	*is a cause for*	Regional Offices
Case X	T17	Regional databases	*is a part of*	Regional Offices
Case X	T18	None formally	*is a characteristic of*	Strategic Alliances
Case X	T19	State education endorsement	*is a characteristic of*	Marketing
Case X	T20	Quality product	*is a part of*	Product
Case X	T20	cost effective	*is a characteristic of*	Product
Case X	T20	convenient	*is a part of*	Product
Case X	T20	high standards	*is a characteristic of*	Product
Case X	T20	Will not exhibit other inferior products on web site	*is a part of*	Product
Case X	T21	Lack of customers	*is a reason for*	EC Problems
Case X	T21	Critical Mass	*is a reason for*	EC Problems
Case X	T22	Clients don't have necessary access	*is a reason for*	EC Problems
Case X	T22	Clients too busy	*is a part of*	EC Problems
Case X	T22	Faster connectivity will improve things	*is a part of*	EC Problems
Case X	T23	Strategic Advantage acquired	*is a part of*	Competitive Advantage
Case X	T23	First mover advantage	*is a reason for*	Competitive Advantage
Case X	T23	Already have the database	*is a reason for*	Competitive Advantage

Domain Analysis Worksheet: Case X

	Ref	Included Terms	Semantic Relationship	Domain
Case X	T24	Competitors are not visible	*is a stage of*	Industry
Case X	T25	Costs of marketing	*is a part of*	EC Problems
Case X	T25	Cost of getting impact	*is a part of*	EC Problems
Case X	T26	Business will grow by word of mouth	*is a way to*	Marketing
Case X	T27	$200,000 estimated investment	*is a characteristic of*	Costs
Case X	T27	Programming costs negligible	*is a part of*	Costs
Case X	T27	developed in-house	*is a cause for*	Costs
Case X	T28	Just wait for the long term return	*is a part of*	EC Strategy
Case X	T28	provide search facility for products	*is a part of*	EC Strategy
Case X	T29	Assume trust in customer	*is a part of*	Electronic Payment System
Case X	T30	Minimise potential for fraudulent activity	*is a part of*	EC Problems
Case X	T30	Potential lost $40 maximum	*is a characteristic of*	Security
Case X	T31	Develop business further	*is a part of*	Future
Case X	T31	Long term return	*is a part of*	Future
Case X	T31	Wait for critical mass, faster connectivity, accessibility to be better	*is a part of*	Future
Case X	T32	Provide high level of service possible	*is a reason for*	Customer Service
Case X	T32	Customised web interface	*is a reason for*	Customer Service
Case X	T32	E-commerce application promotes convenience in its use	*is a reason for*	Customer Service
Case X	T33	Initially developing e-commerce application	*is a cause for*	EC Problems
Case X	T33	ISP level of service	*is a cause of*	EC Problems

Domain Analysis Worksheet: Case E

	Ref	Included Terms	Semantic Relationship	Domain
Case E	T1	Corporate apparel supplier	*is a part of*	Business Background
Case E	T1	19 Full time staff	*is a characteristic of*	Business Background
Case E	T2	Replace manual order entry system	*is a reason for*	EC Strategy
Case E	T2	Improve customer inquiries	*is a reason for*	EC Strategy
Case E	T2	Speed up query process (reduce costs)	*is a reason for*	EC Strategy
Case E	T2	Provide a valuable customer tool	*is a reason for*	EC Strategy
Case E	T2	Provide an apparel management system for customer	*is a reason for*	EC Strategy
Case E	T2	Provide a budget monitoring system for customer	*is a reason for*	EC Strategy
Case E	T3	Pilot well received by major customers	*is a part of*	EC Clients
Case E	T3	Save time for corporate customers to manage their orders	*is a reason for*	EC Driver
Case E	T4	Explicit strategy to use e-commerce	*is a part of*	EC Strategy
Case E	T4	Establish a plan	*is a characteristic of*	EC Strategy
Case E	T4	Add value for customers	*is used for*	EC Strategy
Case E	T4	Aim to retain customers	*is a reason for*	EC Strategy
Case E	T5	Help customers manage their employee requirements	*is a reason for*	EC Application
Case E	T5	Require to alter internal IS system	*is a part of*	EC Application
Case E	T5	Connect the new system to the Internet	*is a part of*	EC Application
Case E	T6	Web consultant and Manager	*is a kind of*	EC Driver
Case E	T6	Industry is very competitive	*is a reason for*	EC Driver
Case E	T6	Proactive management	*is a reason for*	EC Driver
Case E	T6	Provide a unique service to customers	*is a part of*	EC Driver
Case E	T6	Internet used facilitate strategy	*is a characteristic of*	EC Driver
Case E	T6	Differentiate business from competitors	*is a reason for*	EC Driver
Case E	T7	Computer literate	*is a part of*	EC Clients
Case E	T7	Encouraging e-commerce activity	*is a characteristic of*	EC Clients
Case E	T8	Provide customers "one stop shop"	*is a reason for*	EC Strategy
Case E	T8	value added service to customers	*is a part of*	EC Strategy
Case E	T8	personalise product	*is a part of*	EC Strategy
Case E	T9	Competitive Advantage sought	*is a reason for*	Competitive Advanatge
Case E	T10	Not providing a service	*is a part of*	Competition
Case E	T10	State and National competitors	*is a part of*	Competition
Case E	T10	Product suppliers are potential competitors	*is a kind of*	Competition
Case E	T11	Opportunity to market other products lines with core apparel	*is a part of*	EC Strategy

Domain Analysis Worksheet: Case E

	Ref	Included Terms	Semantic Relationship	Domain
Case E	T12	E-commerce application integrate to existing accounting system	*is a stage of*	EC Application
Case E	T12	Stage approach	*is a part of*	EC Application
Case E	T12	Minimise impact on business processes	*is a characteristic of*	EC Application
Case E	T12	Financial requirements minimised	*is a part of*	EC Application
Case E	T13	Existing PC network	*is used for*	IT Infrastructure
Case E	T13	Need to create second database	*is a part of*	IT Infrastructure
Case E	T13	Upgrade from mini computer	*is a stage of*	IT Infrastructure
Case E	T13	Network upgraded two years ago	*is a part of*	IT Infrastructure
Case E	T14	Regional office in Launceston	*is a characteristic of*	Business Background
Case E	T14	remote access	*is a part of*	Business Background
Case E	T15	No network between offices	*is a stage of*	IT Infrastructure
Case E	T15	Future network planned	*is a part of*	IT Infrastructure
Case E	T16	Web interface	*is a characteristic of*	EC Application
Case E	T16	Exiting system provides the "backbone"	*is a characteristic of*	EC Application
Case E	T16	MS Access application	*is a characteristic of*	EC Application
Case E	T17	Head office staff are computer literate	*is a result of*	Training
Case E	T18	Management motivate staff	*is a characteristic of*	Management
Case E	T19	Save time for customers	*is a reason for*	EC Strategy
Case E	T20	E-commerce application uses a mirror copy database	*is a part of*	EC Application
Case E	T21	Web site hosted by ISP	*is a part of*	Web Site
Case E	T22	Orders converted to faxes	*is a stage of*	EC Application
Case E	T22	Use a fax routing system	*is a part of*	EC Application
Case E	T22	Dial-up access to Internet currently	*is a characteristic of*	EC Application
Case E	T23	Management retains control (non technical)	*is a characteristic of*	EC Support
Case E	T23	Manager hands on operator	*is a characteristic of*	EC Support
Case E	T24	Haven't looked at using e-commerce with suppliers	*is a part of*	Supply Chain
Case E	T24	Future consideration	*is a part of*	Supply Chain
Case E	T24	Some are looking at providing systems	*is a characteristic of*	Supply Chain
Case E	T24	Constant orders every few days	*is a part of*	Supply Chain
Case E	T25	Customers can get order reports	*is a reason for*	EC Application
Case E	T25	Customers can reconcile orders	*is a reason for*	EC Application
Case E	T25	Adopt new reports if customer request it	*is a part of*	EC Application

Domain Analysis Worksheet: Case E

	Ref	Included Terms	Semantic Relationship	Domain
Case E	T26	Just installed e-mail	*is a stage of*	Communications
Case E	T27	Online feedback system	*is used for*	Customer Service
Case E	T28	Genuine interest from customers	*is a characteristic of*	EC Clients
Case E	T28	Customers are web enabled	*is a characteristic of*	EC Clients
Case E	T28	Minimal training required to use system	*is a part of*	EC Clients
Case E	T29	Existing EFTPOS credit card facility	*is used for*	Electronic Payment Systems
Case E	T29	No automatic bank reconciliation currently	*is a part of*	Electronic Payment Systems
Case E	T29	No plan to introduce online payment systems	*is a part of*	EC Application (EPS)
Case E	T30	Customers located in Tasmania and Victoria	*is a part of*	EC Clients
Case E	T30	Major corporate customers located in Tasmania	*is a part of*	EC Clients
Case E	T30	E-commerce system aimed at corporate customers	*is a part of*	EC Clients
Case E	T31	No product catalogue produced for customer	*is a part of*	Product
Case E	T31	E-commerce system will be the catalogue	*is a characteristic of*	Product
Case E	T32	No major problems	*is a part of*	EC Problems
Case E	T33	Existing system was not an open system	*is a reason for*	EC Problems
Case E	T33	Integration into backend system proved difficult	*is a cause of*	EC Problems
Case E	T33	Developers had prior experience converting existing system	*is a part of*	EC Problems
Case E	T33	Total integration is possible critical mass of transactions increases	*is a part of*	EC Problems
Case E	T34	Niche marketing strategy	*is a used for*	Marketing
Case E	T34	Word of mouth	*is a characteristic of*	Marketing
Case E	T35	Based on customer feedback	*is a part of*	EC Strategy
Case E	T36	Not known to management	*is a part of*	Problems
Case E	T37	Deciding how to use e-commerce not obvious initially	*is a stage of*	EC Strategy
Case E	T37	EC Strategy was planned	*is a part of*	EC Strategy
Case E	T38	LAN link to regional office	*is a part of*	Future
Case E	T38	incorporate complimentary businesses	*is a stage of*	Future
Case E	T39	EC strategy aimed at providing better customer service	*is a reason for*	EC Strategy
Case E	T39	Want to retain customers	*is a reason for*	EC Strategy
Case E	T40	Competitive Industry	*is a part of*	Industry
Case E	T40	First mover advantage sought	*is a reason for*	Competition
Case E	T40	Don't want to follow competitors innovation	*is a part of*	Competition

Domain Analysis Worksheet: Case R

	Ref	Included Terms	Semantic Relationship	Domain
Case R	T1	Products to avoid bad debt	*is a reason for*	Business Background
Case R	T1	Based on credit life cycle	*is a characteristic of*	Business Background
Case R	T1	Credit reporting	*is a part of*	Business Background
Case R	T1	Trade Gazette	*is a used for*	Business Background
Case R	T1	Legal Actions	*is a part of*	Business Background
Case R	T2	42	*is a characteristic of*	No of Employees
Case R	T2	2 full time IT Staff (Interviewer observation)	*is a characteristic of*	No of Employees
Case R	T3	Hobart (20 staff)	*is a characteristic of*	No of Employees
Case R	T3	Launceston (13 staff)	*is a characteristic of*	No of Employees
Case R	T3	Devonport (4 staff)	*is a characteristic of*	No of Employees
Case R	T3	State wide information service	*is a characteristic of*	Business Background
Case R	T4	Tasmanian market	*is a kind of*	EC Clients
Case R	T4	Use to have mainland interests	*is a kind of*	EC Clients
Case R	T5	National provider (Credit Advantage)	*is a part of*	Competition
Case R	T6	70% Market Share	*is a characteristic of*	Business Background
Case R	T6	Collect debt information	*is a characteristic of*	Business Background
Case R	T6	Credit Reporting	*is a characteristic of*	Business Background
Case R	T7	Provider of credit information services	*is a characteristic of*	Business Background
Case R	T7	Database has better content than competitors	*is a part of*	Competitive Adv
Case R	T7	different risk profile	*is a part of*	Business Background
Case R	T8	Attract interstate clients	*is a part of*	EC Benefit
Case R	T9	Wanted more than a static web site	*is a part of*	EC Strategy
Case R	T9	Develop a dynamic web site	*is a part of*	EC Strategy
Case R	T9	Interface in existing products	*is a part of*	EC Strategy
Case R	T10	1100 web site users	*is a characteristic of*	EC Clients
Case R	T10	Hard to encourage users initially	*is a characteristic of*	EC Clients
Case R	T11	Innovative use of technology	*is a part of*	Management
Case R	T11	Management wanted to use EC	*is a part of*	Management
Case R	T11	No interested in details	*is a characteristic of*	Management
Case R	T12	Proactive Management decision	*is a part of*	EC Driver
Case R	T12	Innovative management	*is a reason for*	EC Driver
Case R	T13	Online credit reporting	*is a result of*	EC Application

Domain Analysis Worksheet: Case R

	Ref	Included Terms	Semantic Relationship	Domain
Case R	T13	EC is a part of the business processes	*is a part of*	EC Application
Case R	T13	Online data entry for debt collection	*is a result of*	EC Application
Case R	T14	Streamline communications between clients and org	*is a part of*	Future
Case R	T14	Offer more services	*is a part of*	Future
Case R	T14	Extend services through all parts of credit life cycle	*is a part of*	Future
Case R	T15	External web developer	*is a part of*	EC Application
Case R	T15	Internal development (system integration)	*is a part of*	EC Application
Case R	T15	Update existing legacy system	*is a part of*	EC Application
Case R	T16	Create a new client interface	*is a part of*	IT Infrastructure
Case R	T16	Base on telephone IVR system	*is a characteristic of*	IT Infrastructure
Case R	T16	Based on a four tier system	*is a characteristic of*	IT Infrastructure
Case R	T17	Cost reduction	*is a reason for*	EC Strategy
Case R	T18	More work required	*is a reason for*	Organisational Change
Case R	T18	New processes created	*is a reason for*	Organisational Change
Case R	T18	Reduce costs	*is a part of*	EC Benefits
Case R	T19	Instant access to product	*is a reason for*	EC Benefits
Case R	T19	Clean' data format	*is a reason for*	EC Benefits
Case R	T19	Current information uptodate info	*is a reason for*	EC Benefits
Case R	T19	Provide immediate credit report	*is a reason for*	EC Benefits
Case R	T19	Cost of telephone calls saved	*is a cause of*	EC Benefits
Case R	T20	Provide selected info products	*is a part of*	EC Application
Case R	T20	retain income base	*is a part of*	EC Application
Case R	T21	E-mail communication	*is a part of*	EC Application
Case R	T21	debt collection lodgement via email	*is a characteristic of*	E-mail
Case R	T21	Enter debt information using eforms	*is a part of*	E-mail
Case R	T21	Bulk lodgement	*is a characteristic of*	E-mail
Case R	T22	Integrate directly to existing system	*is a part of*	EC Application
Case R	T22	Multiple format integration for lodgements	*is a part of*	EC Application
Case R	T23	Content providers supply electronically	*is a characteristic of*	Supply Chain
Case R	T23	Info providers email supply of content	*is a characteristic of*	Supply Chain
Case R	T23	Content used to be manually inputted	*is a characteristic of*	Supply Chain

Domain Analysis Worksheet: Case R

	Ref	Included Terms	Semantic Relationship	Domain
Case R	T23	$5000 a year costs for 'bread and butter' information	*is a part of*	Supply Chain
Case R	T23	Content provision via email	*is a part of*	E-mail
Case R	T24	Acpack	*is a characteristic of*	IT Infrastructure
Case R	T24	Link into Oracle	*is a part of*	IT Infrastructure
Case R	T24	EFT with Banks	*is used for*	IT Infrastructure
Case R	T25	Clients can pay by EFT	*is a characteristic of*	EC Clients
Case R	T26	Internally supported	*is a characteristic of*	EC Support
Case R	T26	Internal IT Staff	*is a characteristic of*	EC Support
Case R	T26	Oracle skills	*is a part of*	EC Support
Case R	T27	Private networks	*is a characteristic of*	IT Infrastructure
Case R	T27	ISDN based	*is a characteristic of*	IT Infrastructure
Case R	T27	Upgrade from dumb terminals to TCPIP	*is a characteristic of*	IT Infrastructure
Case R	T27	Terminal servers	*is a characteristic of*	IT Infrastructure
Case R	T28	Established business over 100 yrs old	*is a characteristic of*	Business Background
Case R	T28	Change has been evolutionary	*is a characteristic of*	Business Background
Case R	T29	Existing processes unchanged	*is a part of*	Organisational Change
Case R	T29	EC application is transparent to staff	*is a part of*	Organisational Change
Case R	T30	Web access is an alternative	*is a reason for*	EC Clients
Case R	T30	Information directly entered by clients	*is a reason for*	EC Clients
Case R	T30	Contact management system	*is used for*	EC Clients
Case R	T30	System is focused at client interface	*is a used for*	EC Clients
Case R	T31	core operators are unaffected by e-commerce system	*is a part of*	Organisational Change
Case R	T31	Streamline existing work	*is a cause of*	Organisational Change
Case R	T31	Provide new work tools	*is a cause of*	Organisational Change
Case R	T31	White pages search facility	*is a reason for*	Internet
Case R	T32	Limited staff access	*is a part of*	Internet
Case R	T32	Staff abused use of Internet	*is a part of*	Internet
Case R	T32	Internet access not productive	*is a part of*	Internet
Case R	T33	Important client comms channel	*is a result of*	E-mail
Case R	T33	Status reports delivered	*is a characteristic of*	E-mail
Case R	T34	reluctant to use e-mail for marketing	*is a part of*	Marketing
Case R	T35	Critical mass of clients have web access	*is a characteristic of*	EC Clients

Domain Analysis Worksheet: Case R

	Ref	Included Terms	Semantic Relationship	Domain
Case R	T35	Critical mass of clients to contribute to database	*is a reason for*	EC Strategy
Case R	T35	Enormous growth over 18 months	*is a cause of*	EC Strategy
Case R	T35	Intuitive timing to use e-commerce	*is a characteristic of*	EC Strategy
Case R	T35	Strategy is based on "gut" feel	*is a part of*	EC Strategy
Case R	T35	Monitor Net usage statistics	*is a used for*	EC Strategy
Case R	T36	Organisational control of EC system	*is a part of*	EC Application
Case R	T36	Access mostly during business hours	*is a characteristic of*	EC Application
Case R	T37	Organisational appears innovative	*is a result of*	Web Site
Case R	T37	improved organisational image	*is a result of*	Web Site
Case R	T37	Web site is part of the business evolution	*is used for*	Web Site
Case R	T38	Org is market leader in the State	*is a way to*	Competition
Case R	T38	Interstate competition	*is a part of*	Competition
Case R	T38	Competition has consolidated	*is a part of*	Industry
Case R	T39	Market has shrunk to Tasmanian Businesses	*is a characteristic of*	EC Clients
Case R	T39	Get a few mainland clients	*is a kind of*	EC Clients
Case R	T39	Improve customer service	*is a result of*	EC Clients
Case R	T40	Provide more services than competition	*is a way to*	Competition
Case R	T40	Unique product range	*is a part of*	Competitive Advantage
Case R	T40a	Unique array of services	*is a reason for*	Competitive Advantage
Case R	T40a	Web site is unique	*is used for*	Competitive Advantage
Case R	T40a	Broad range of products	*is a reason for*	Competitive Advantage
Case R	T41	Hard to perform	*is a part of*	Cost Benefit
Case R	T41	Estimated cost savings	*is a part of*	Cost Benefit
Case R	T41	Preliminary Investigation for government grant	*is a reason for*	Cost Benefit
Case R	T41	Perceived benefit	*is a result of*	Cost Benefit
Case R	T42	Government subsidised development	*is a reason for*	Government
Case R	T42	EC project would begin without govt help	*is a part of*	Government
Case R	T43	Non-static web site required	*is a part of*	EC Strategy
Case R	T43	strategy formulated by talking to clients	*is a part of*	EC Strategy
Case R	T43	Provide value added services	*is a part of*	EC Strategy
Case R	T43	Consult clients with EC Development	*is a part of*	EC Strategy
Case R	T43	brochure ware not a viable model	*is a kind of*	EC Strategy

Domain Analysis Worksheet: Case R

	Ref	Included Terms	Semantic Relationship	Domain
Case R	T43	Clients want to use web-site as a tool	*is a reason for*	EC Strategy
Case R	T44	Web development problems	*is a cause for*	EC Problems
Case R	T44	Difficulty integrating existing system	*is a cause of*	EC Problems
Case R	T44	e-commerce development slow	*is a reason for*	EC Problems
Case R	T45	Some management have a 'Low interest in technology'	*is a characteristic of*	Management
Case R	T45	Other management not concerned with technology details	*is a part of*	Management
Case R	T45	Knowledge with Technology	*is a characteristic of*	Management
Case R	T46	Low initial technical knowledge about EC	*is a part of*	IT Infrastructure
Case R	T46	Upgrade existing networks	*is a part of*	IT Infrastructure
Case R	T46	Host web site internally (for security)	*is a part of*	IT Infrastructure
Case R	T46	incorporate upgrade of IT infrastructure	*is a way to*	IT Infrastructure
Case R	T47	Concerned about security	*is a part of*	Security
Case R	T47	Need to protect existing info system	*is a reason for*	Security
Case R	T47	Develop own security system	*is a result of*	Security
Case R	T47	develop security system in-house	*is a part of*	Security
Case R	T48	provide value added services	*is a way to*	Future
Case R	T48	transform organisational image from just debt collection and	*is a part of*	Future
Case R	T48	enhance relationships with debtors	*is a way to*	Future
Case R	T48	build relationship between client and debtor	*is a part of*	Future

Appendix Two:
Letter of Introduction

The School of Information Systems
University of Tasmania
G.P.O. Box 252 – 87
Hobart Tasmania 7001

Date
Name of Organisation
Address

Dear Sir/Madam

I am writing to seek your assistance with some research currently undertaken by the School of Information Systems at the University of Tasmania. There has been considerable interest with the use of electronic commerce by large organisations however formal research with regards to electronic commerce and small and medium sized enterprises in Australia, has been lacking.

I am currently researching the application of electronic commerce by small and medium sized enterprises. This research will form the basis for a Ph.D. degree. The objective of this research is to define a suitable framework to depict the use of electronic commerce applications within an organisation. The research will outline the changes upon the organisation as a result of adopting various forms of electronic commerce.

It is envisaged that approximately 30 case studies will be conducted in Tasmania and other regions of Australia. I would like to include your business to be apart of this important research. The case studies would involve one or two interviews of approximately one hour in length. The results of this research is important to all small and medium sized enterprises that maybe considering the adoption or expansion of electronic commerce within their organisation. A set of working papers will be written during the course of the research. These will be made available to you and the business community.

It would be greatly appreciated if you can assist with my research. Your participation is entirely voluntary and you may withdraw at any time without prejudice. All data collected from the case study will be held in a locked cabinet in my office at the School of Information Systems. The data will only be privy to myself. The data will be destroyed when all the requirements of the PhD candidature have been completed.

This project has received ethical approval from the University Ethics Committee. If you have any concerns of an ethical nature or complaints about the manner in which the project is conducted you may contact the Chair or Executive Officer of the University Ethics Committee. The 1999 Chair is Dr Margaret Otlowski, phone(03) 62 267569 and the Executive Officer is Ms Chris Hooper, phone (03) 62 262763. If you have any other queries you may contact me anytime on (03) 62267435 or 0412 122855. Alternatively, you may wish to contact my supervisor Associate Professor Chris Keen on (03) 62262900. I hope to speak with you soon.

Yours sincerely,

Stephen B. Chau
Doctoral Student
School of Information Systems

Appendix Three: Question Frame:

Background Information

- Company Particulars (Contact details, Address, Email, URL, Industry Sector)
- Company profile / philosophy of the company
- Companies core business (product / service)
- Description of core business
- Size of company (# of employees, branches, output, approximate annual turnover)
- Growth of company over the past five years
- Is the company mainly focused on local, national or international markets
- If local, how wide is the region in which the company sells
- If national, which are the main Australian markets, what proportion of products/ service are sold outside the local State, what is the relative importance of sales outside the State?
- If international, what are the main overseas markets, proportions of product / service exported, relative importance of imported inputs etc.

Current Use of E-Commerce/Internet

- How does the company currently use the electronic commerce in its business operations?
- What was the impetus to use electronic commerce?
- What E-commerce/Internet functions are currently available?
- Do you engage in active promotion / marketing / advertising of your company's Internet commerce activities?
- How do you use your web site currently?
- What is your future plans for your web site?
- Does the company accept payment over the Internet?
- What is the level of sophistication of the company's current web site?
- Does the company use any other e-commerce technologies?

Impact of E-commerce/Internet on Organisational Processes (Internal/External)

- How important is the e-commerce in the overall growth of the company.
- How has e-commerce / Internet changes the business processes and/or organisational structure?
- How important is the e-commerce for the company in accessing overseas markets / supplying inputs in inter-firm trading?
- How has the e-commerce impacted on the company's competitiveness?
- How important is the e-commerce in raising the companies competitiveness?
- How competitive are core markets? (local, national, or international)
- Is the e-commerce/Internet being used by competitors?
- Has there been a first mover advantage, or are you maintaining your competitive position?
- Does the company expect to gain continued/expanded competitive advantage from future use of the Internet?

E-commerce / Internet Problems

- Has e-commerce/ Internet delivered specific business outcomes sought by the company from this investment
- Have any problems been encountered using the e-commerce/Internet.

Future Use of E-commerce / Internet

- Does the company intend to expand the use of the e-commerce/Internet in its operations?
- If so, how does the company expect to develop the use e-commerce /Internet?
- What are the chief reasons for expanding the use of the e-commerce/Internet?

Appendix Four: Case Study Summaries

Case ID	Location	Age	Size	Industry
• A	• TAS	• 80	• 3	• Agricultural

Case A is a family run farm located in the north west of Tasmania. The farm specialises in the production of beef stock for the beef industry. The family has had ties with the farming industry for over 100 years. The farm still continues to run as a family business. Each year the farm holds a sale of their Angus beef stock. Traditionally the business produced a booklet describing all past particulars of their breed stock. The production of the catalogues is a costly and time-consuming job. The business now publishes the genetic information about their stock on the Internet. The owner taught himself how to create the business's web page and as a direct result of the business' Internet presence the business has attracted enquires from all over the world, particularly in the USA.

The family has only one computer. The computer is used for updating the electronic and paper based booklets. The website provides generic information about the American bloodlines, which can be used, for artificial insemination. Brian believes if he combines the American bloodlines with his current breeding stock, it may well put his family's business at a distinct advantage to other breeders in Australia and other parts of the world.

The Internet has provided a viable alternative to disseminate stock information to prospective cattle customers. It has provided an avenue to discuss Angus breeding with other breeders around the world. The Internet is used as an alternative marketing strategy to promote essential information about the business. The Internet has been a valuable resource of information, which can add value directly into the business. The owner tried unsuccessfully for two years to connect to the Internet. The efficiency of the phone lines to the ISP at the time were unreliable to host an Internet connection. Currently the reliability of the phone lines for data communication is somewhat better.

Case ID	Location	Age	Size	Industry
• B	• TAS	• 2	• 2	• Fishing

This business has created highly specialised scientific software to interpret ocean data from sophisticated echo sounders used on research vessels. The software interprets the raw data and manipulates the information into a representation of ocean plots of fish density and population. The business was established five years ago and was initially aimed at customers in Australia. However, in the last eighteen months prior to the interview the business has expanded to include many international customers. The owner, who maintains a working relationship with a software development company, essentially operates the business alone. The software development company provides technical support and management of the software.

This business uses the web extensively to demonstrate the product and to facilitate a communication pathway with current and prospective users and business partners. The core customer groups for this business are all members of the scientific community and are experienced web users. Email is used extensively

between the business associates and clients. Administration and management are accessible twenty-four hours a day, seven days a week. The owner of the business regularly travels around the world marketing the product and can manage his business effectively from any remote location. The web has facilitated the virtual nature of this business, which is not bound by geographical boundaries or time zones. The web-site is central to the business operation, users are able to help themselves to product information, demonstrations and upgrades at their convenience. Similarly the software developers host the website and actively post any upgrades as required.

This business runs efficiently using the web as a business tool to streamline communication and product marketing. All aspects of this business exhibit virtual characteristics. The product is dynamic and easily managed electronically. The business operation is not bound by any temporal or geographical limitations. The business is comfortably managed with few employees and is highly mobile.

Case ID	Location	Age	Size	Industry
• C	• TAS	• 2	• 3	• Hospitality

Case C is a restaurant and cafe is located in Hobart's central business district. The restaurant provides café-style food and catering services for the surrounding offices. The business employ five full time staff with another five casuals. The majority of customers are office workers employed locally. The business also provide catering services for special functions and events.

The restaurant has a personal computer used for desktop publishing, accounting, and email services. The staff developed an idea using the Internet to take on-line orders for lunches and catering services. Traditionally, customers would queue up waiting to be served at the cafe. By using an on-line ordering system meals can be pre-ordered and made available prior to the lunch time rush. On-line customers can either pick up their lunches or have them delivered. Many of the business' customers work in offices that have all day connection to the Internet. These customers can go to the website and customise their orders based on the selection provided. A local ISP receives the orders. The ISP has a fax router installed that will automatically fax the order details to the restaurant. On-line customers have the ability to make their own virtual sandwiches by selecting specific ingredients on the website. Similarly, custom food platters can be created for those customers requiring catering services.

In the future each time an order is received the customers email address will be added to a customer database. By using a list server, the business can send out lunch menus and specials to its on-line customers each day. More importantly, by recording the eating habits of its customers, it can receive direct feedback about which meals are the most popular and what are the likes and dislikes of individual customers. This information is hard to accumulate under traditional restaurant operations. The business can use electronic commerce to streamline their business procedures with customers. It has enabled them to gain new customers but most importantly it has the potential to supply quality customer feedback.

Case ID	Location	Age	Size	Industry
• D	• TAS	• 2	• 5	• Agricultural

Case D is a high tech marketing / distribution company. Management identified an international market potential for the specialised software package. Management successfully formed a strategic partnership with the New Zealand developers that would give the business the Australasian right for distributing this particular software. In just over two years the business can boast a customer base of over 1500, with many corporate multinationals among them. Their extensive marketing expertise and superior service can be accredited to the business' success. The company's growth rate can be partly explained by incorporating the fundamental aspects of electronic commerce successfully. The business has demonstrated that geographical boundaries do not necessarily limit the success of Tasmanian business. They have successfully captured a large slice of the world market and have been rewarded accordingly.

The business operates from a small office above a local suburban shopping centre. Although they are classified as a small business they are part of an international virtual enterprise. By fully utilising the potential of electronic commerce the business can provide the level of service and support appreciated by other large players in the software market like Microsoft, IBM and Borland. Electronic commerce has enabled this small Tasmanian business to operate on the International marketplace efficiently and successfully. In less than three years Protocol has been able to project revenues in excess of a million dollars.

The business uses a range of electronic commerce applications. The business' website is used as a marketing tool. It gives a description of the company and the software they support. Customers have the ability to download a demonstration version of the software that expires in 30 days. Customers can make an order via the Internet, 1800 phone or fax number. The business prides itself by providing a quick turnaround. The majority of customers can receive their orders overnight. They also receive 90 days free telephone or email support.

The staff regularly use email, fax and phone to conduct their national and international business dealings. The speed and cost of communicating via email has considerable benefit however the majority of customers prefer to order using the 1800 phone or fax number. This can be explained by the concern for security with current electronic payments systems. The business readily communicates with their suppliers electronically. Software updates and information are sent electronically using email attachments. This method of communication is instantaneous, cost effective and efficient.

The Internet provides an infrastructure that makes conducting business internationally cheap, fast, and effective. The Internet has broken down geographical and time zone boundaries. The business has been extremely successfully in promoting their product and themselves. The company has received numerous requests from businesses in other countries to become resellers of the software. This has enabled the business to expand quickly into the

international sector. The business now has a presence in New Guinea, Thailand, Singapore, China, Hong Kong and Japan.

Case ID	Location	Age	Size	Industry
• E	• TAS	• 15	• 19	• Wholesale

Case E is a small Tasmania business specialising in the sale of corporate apparel. Case E has a large customer base located throughout Tasmania and in some areas of the mainland. In the past staff spent a large amount of time answering customer inquiries particularly about order and invoice details. The business acknowledged the need to automate as much of the customer queries as possible. Too much time and employee resources were spent looking through past orders for particular information. In consultation with local web consultants a new system could provide a level of customer service that was impractical in the past. Management wanted a product that would not just automate the current ordering systems but provide extra value for their customer base.

The business developed an electronic commerce strategy to use the Internet to gain greater efficiencies, improve their customer service and secure their existing customer contracts. The business planned to use the Internet to gain a competitive edge by supplying customers with the extra benefit without additional costs. Developers began developing an apparel management system that could manage individual orders from numerous companies, as well as offer a system to manage customers budgetary constraints. The system would be accessible across the Internet by any customers.

The business is in a highly competitive business. Management hopes to provide greater differentiation from their existing competitors by installing the new Apparel Management System (AMS). The development of the AMS has received considerable encouragement from their valued customers. Management wanted the business to provide a one stop shop, with value added service that saves time, that is efficient, and is friendly. The AMS will provide corporate customers an extra incentive to continue to purchase from the business. No major problems had been reported with the design and development of the system.

Case ID	Location	Age	Size	Industry
• F	• TAS	• 12	• 14	• Hospitality

Case F is an independent hotel located close to the city of Hobart. The hotel has been operating for approximately 10 years. The hotel can accommodate 200 guests in 68 rooms. The majority of reservations are made by travel agents, travel wholesalers, government agencies and universities. Other reservations are received directly from the guests themselves. The majority of bookings are handled via conventional fax and phone.

The hotel has a small network of six personal computers. The computers are used to control the reservations and financial functions of the business. The staff payroll system is automatically linked with the hotel's bank. The computers are also used to support the in-house publishing of marketing information, like pamphlets and advertising flyers. The hotel's management takes an active role in developing the hotel's computing system. Plans are in place to increase the sophistication of their current marketing activities.

Case F investigated the use of the Internet as an alternative avenue to attract customers. Consequently, the hotel is able to accept and process reservations booked via the hotel's website. Reservations have been received from south east Asia and the United States. The hotel connects to the Internet three times a day to read and reply to email inquiries and reservations.

The hotel benefits greatly by using the existing computing resources to produce much of their advertising literature. In the future the hotel plans to incorporate multimedia functionality to their website. Guests will be able to preview the type of facilities and rooms available to prospective guests. Guests will be able to enter the virtual Case F on the Internet and explore the hotel rooms and function facilities with exceptional clarity and stereo sound. The hotel believes that the new marketing aid will attract potential guests to their hotel.

Case ID	Location	Age	Size	Industry
• G	• TAS	• 1	• 4	• Agricultural

This business represents a new venture in selling fruit trees on-line. The parent organisation is a fruit grower supplying many local and national markets. Six years ago management began to sell fruit trees directly on-line to customers bypassing the traditional supply chains of associated wholesale and retail nurseries. The virtual business is conducted from a farm. From its inception the business was aimed solely at using the web as the only trading platform. The e-commerce application was developed in-house by the owners of the business. The development of the application was further supplemented by technical expertise from an external Internet Service Provider (ISP). The web-site has taken five years to develop and was created in-house by one of the company directors.
The owners of the business believe by shortening the conventional supply chain, the web has provided a new opportunity to sell their product direct to the end customer. They acknowledge that although the volume of sales may be low compared to traditional retail nurseries, the extra margin gained selling to the public will be adequate compensation. The direct contact with customers allows the owners to provide superior product information and advice, which cannot be matched by retail nursery outlets. Technically the business has the knowledge to grow its products anywhere in the Southern Hemisphere.

This business has no retail address or conventional retail outlets. The business strategy is aimed at selling their products directly on-line. This business has a degree of virtual-ness as the business possesses no retail front other than its web interface. Customers can be located globally and although the business may never met them face-to-face the web ensures a high level of customer contact and service. The use of web technologies provides the backbone for this business strategy. The web has enabled this business to establish itself in the global economy and the cost of communicating and marketing this new business to prospective customers is significantly reduced in comparison to its off-line operations.

Case ID	Location	Age	Size	Industry
• H	• TAS	• 7	• 8	• IT Industry

Case H is a web consulting company. The business uses e-commerce to develop and support their client's web-based applications. The use of e-commerce technologies streamlines the development and testing of their client sites. Most of the business' clients are local businesses. The Camtech secure on-line transaction system is used for those clients that require on-line payment systems. The demand for web development services has increased significantly over the last twelve months. Word of mouth is found to be the best method of marketing the business' services.

E-commerce is used within the business to facilitate a comprehensive intranet and knowledge base of client's e-commerce systems. The use of e-commerce forms a central mechanism to support, develop and manage client's services. Most problems occur due to the lack of knowledge and understanding by clients that are have low computer skills and knowledge. Most clients don't specifically know what they want. The process to define the client's requirements is often frustrating and time consuming.

Case ID	Location	Age	Size	Industry
• I	• TAS	• 11	• 27	• Mining

Case I provides fully integrated communication systems for above and below ground operations. Their niche market is the mining industry. Case I can provide instant communications between management, work crew, miners and maintenance staff. They can send and receive telephone calls while underground. With the use of radio modems, data transmission is also possible between surface and underground.

The business has grown from a small family business to a company employing over twenty people Australia wide. Case I is considered a market leader in underground communications in Australia and received the 1995 Telstra and Tasmanian Government Small Business Award.

Initially Case I's computing power consisted of a few personal computers used for financial applications, quotations and office work. They staff soon found that the office data was scattered independently amongst the few machines. It became inefficient to house the business's information in this manner. Twelve months ago their computing system was revamped. They now have eight PC's connected to a central server. All information is located on the server and can be accessed from any workstations. Each staff member has an email address so they can individually send and receive email personally between each other and externally with clients or business partners. This has enabled a platform for efficient information flows and a foundation for electronic commerce activities. Case I uses the Internet to enhance their communications between field workers and business partners around the world.

Case I has business partners in Canada. Using the Internet's ICQ, Case I is able to chat with Canadian counterparts in real time for a fraction of cost compared to using traditional conference calls. Case I's field workers are often updating equipment in remote mines around Australia and the world. Previously any updates were sent out on floppy disk via the mail. A technician may have to wait several days for updates. Now field workers can have their updates emailed

directly to them instantly. The update scenario can happen in minutes rather than days and at a fraction of the cost.

Sales staff also have the ability to dial directly into the central server to download product information or specifications. When the appropriate security is in place staff will be able to download information from the server using the Internet, utilising a cost-effective form of data transmission. The ability to send information or quotes via email to interested parties has saved considerable time and communication costs. ICQ has provided a low budget form of call conferencing for trading partners around the world. ICQ has provided a communication channel where multiple business partners can discuss business real-time and at minimal cost. The ability of field workers to receive software updates for equipment via email has saved valuable time and resources. Field workers are used more efficiently, they no longer have to wait for days to receive an update, customer service has improved, problems are resolved promptly, and Case I can concentrate resources elsewhere.

Case I also designs custom cases for their communication equipment. The designs of the cases are sent via email to a designer in Sydney for refinement. Once Case I has endorsed the final design, the design is sent electronically to a fabricator in Brisbane. The final product is then shipped back to Tasmania for distribution. Case I coordinates the design and receives the finished product without ever having to leave their head office. Case I has embraced different aspects of electronic commerce successfully into their business processes. Electronic commerce has streamlined their business processes, reducing communication costs and enhancing customer service by reducing reaction times to problems and customer inquiries.

Case ID	Location	Age	Size	Industry
• J	• TAS	• 9	• 9	• Manufacturing

Case J is a family business established in 1979. The business specialises in the manufacturing of fishing lures. The lures are designed and produced locally in Tasmania. The business sells to 46 countries around the world from Iceland to New Zealand. The family business started from a conversation at a local hotel between two brothers. It now employs a dozen people at its local headquarters in Hobart. The business conducts its design, manufacture, storage and shipping from the one location.

The firm has a few stand-alone personal computers used to create an electronic catalogue of their products available on the Internet. The computers are also used to design their lures and assist with general accounting functions. The business uses its computing power to primarily support the financial controls of the business. Recently the business has adopted electronic banking systems into their work practices. They have automated their payroll systems and electronic transfer of funds between suppliers and their office. Electronic banking has saved considerable administration time and transaction costs. They no longer have to visit the bank each time to transfer funds between their local bank accounts and their overseas supplier's bank accounts. The use of electronic banking facilities enables the business to reduce operating and transaction costs. Staff time can be

used more productively and the business has greater control of banking operations.

Recently the owner has investigated the use of the Internet, electronic catalogues are available on-line and email communications can provide direct customer advice for individual fishing requirements. Queries from the website are emailed directly to the office. Electronic catalogues and other business information can be emailed back to prospective customers. The result is an information turnaround that is cheaper and faster than using the traditional glossy brochures and mail service.

Internet users have the ability to access on-line catalogues and order the lures directly from the local headquarters. The orders are received via email. If an agent is located close to the customer, the order is referred on to the nearest agent. If no agent is readily available, the business will ship directly to the customer, once the customer's credit card details have been validated. The Internet has created new markets and customer leads around the world. Management believes that their website is a success and will continue hosting the site into the future.

Case ID	Location	Age	Size	Industry
• K	• TAS	• 12	• 18	• Insurance

Company K, is an insurance loss adjuster that is a part of a network of national offices. They are involved with investigating insurance claims for a wide array of policies. The company employs eighteen staff and has been operating for over twelve years. The business has its own in-house IT team that is responsible for the administration and support of existing IT infrastructure. The company has a network link to other branches offices on the mainland and email contact with local agents. E-commerce currently used to facilitate the communication between agents and local offices. Agents can enter information directly into their computers at the point of contact with clients.

The use of e-commerce has increased the speed of communications and the accuracy of reports. Digital photos can be taken and forwarded electronically for storage in each local server. E-commerce has significantly improved the exchange of information within the local office and the production of reports. The integration of e-commerce into core business processes has produced real benefits. Because the company has it's own internal IT staff the incorporation and use of e-commerce has not presented any major problems.

Case ID	Location	Age	Size	Industry
• L	• TAS	• 8	• 3	• IT Industry

Case L is a small Tasmanian business that began 8 years ago. The business in the computer industry specialising in creating and supporting custom computer applications. To supplement their existing services, the business has embarked upon an electronic commerce strategy to provide computer consumables to customers directly from mainland distributors.

The business has just finished developing an electronic shopping facility so those customers can create an electronic order for computer products via the business' web page. It is envisaged that the order details will be formatted into a standard pro-forma, which is then sent automatically or manually to the associated distributor. The distributor will complete the supply chain by sending the products directly to the customer. This removes the need for double handling of the order and makes a more efficient delivery system. As result the business need only carry limited stock for emergencies. The business believes that they can they broaden their advertised range of stock by publishing what stock items their distributors carry. The business' role in the supply chain will move from that of a supplier to one of an advertiser of computer consumables. The business never needs to handle the ordered consumables. Payments of the orders are settled on a monthly account basis.

Initially the electronic shopping facility will be tested upon existing customers and ultimately it hopes to attract business away from its competitors. The business has found that the majority of their customers are connected to the Internet. Initially most customers were connecting to the web for fun. These days their customers are using the web as a business tool.

Case ID	Location	Age	Size	Industry
• N	• TAS	• 3	• 8	• Manufacturing

Case N is a subsidiary of one of Australia's largest privately owned companies. The parent company purchased the original business from the Tasmanian State Government in 1996. The business began a joint venture between local farmers, the State Government and the University of Tasmania. Currently there are four people employed in the business. It is envisaged that more people will be employed in the future.

The business has a dedicated data line to their parent company in Sydney. The business has three personal computers networked together and a scanner. The business uses a range of desktop software and accounting systems. The parent company in Sydney controls the accounting system remotely. All orders and stock levels are entered locally. The information is then sent live to Sydney for processing. A remote communications software package is used to facilitate the link between Hobart and Sydney.

The business actively use the Internet to search for new customers and markets. The general manager uses the Internet as an important tool for generating market leads and market research. He also uses the Internet to determine and estimate the current and future commodity prices of the oils sold by the company. By sourcing independent information about worldwide oil prices from commodity brokers, and international flavourists and perfumers, the business has the potential to forecast the demand of certain oils and hence alter planting schedules to meet the forecasted demand. The Internet is also used to find new customers and markets around the world. If clients request a supply of non-core oils, the business can utilise the Internet to seek prospective third party suppliers of those non-core oils.

The business use electronic commerce in a variety of ways. By implementing a dedicated line to their Sydney office, all accounting functions are handled

centrally. Accountants in Sydney can analyse the business' financials and give advice and recommendations if required. The business uses its web page to market its products internationally. They receive inquiries and orders via email from their web page. Product information and quotations can be generated and faxed by computers back to customers using facsimile software. The direct line to Sydney expands the business' communications infrastructure so customer leads, documents, email, stock levels and financials can be shared directly with management in Sydney. The direct line provides a secure conduit for the transmission of company information.

Case ID	Location	Age	Size	Industry
• O	• TAS	• 14	• 26	• Retail

Case O is a franchise operator in the retail food industry. The franchisees manufacture and sell their own produce through their retail outlets. The business controls the overall management of the business, such as accounting, product, pricing, and supplier relationships. There are twenty-six staff employed at the head office. They have been established for 14 years, expanding rapidly over the past 5 years. They expect to continue this growth via franchisee outlets interstate and overseas. Currently the business is installing intranet and extranet systems to maintain a greater level of communications with franchisees. Cash registers in each franchisee were replaced with new technology that allows the Case O to monitor business operations remotely. Case O describes their new point of sale system as evolutionary. It was developed in-house and enables head-office to down-load information at any time regarding such things as turnover, number of customers served and number of mistakes made by an individual operator. Initial problems related to re-configuring the database. These problems were only minor and the database is now accessible via the Intranet. The business intends reduce the use of external service providers and expand its internal IT support staff. The business' website is only used as a marketing and promotional tool. The use of e-commerce to manage the franchise network is an integral part of the business. The thirteen stores statewide can be administered centrally at one convenient location.

Case ID	Location	Age	Size	Industry
• P	• TAS	• 14	• 65	• Aquaculture

Case P is a seafood wholesaler who have been farming and distributing goods within Australia and overseas for the past 14 years. The company maintains a product range of over 100 stock items. All stock is aimed for the export on mainland Australia and overseas. The company has export distributors located in Melbourne, Brisbane and Sydney, 40% of sales is for the domestic market while 60% is exported overseas. E-commerce presently plays a minor role in business operations. The company relies heavily on a bar coding system to manage and control stock inventories. Phone and fax is the standard form of communications in the industry and is unlikely to change. IT is viewed as a support tool and not a strategic tool. The potential for use of e-commerce is significant but management is reluctant to spend capital resources on areas that may potentially provide benefit. The market for their product varies from season to season and it is hard to predict with certainty the likely demand and product availability each year. This further inhibits the chance of establishing any significant e-commerce initiatives in this business. The company has a static website which it uses for marketing.

The company has two skilled IT support staff which are employed to maintain and improve their product inventory and farming operations systems.

Case ID	Location	Age	Size	Industry
• Q	• TAS	• 20	• 25	• Wholesale

Case Q is a medium sized business that primarily wholesales fruit and vegetables. The business is well established and is considered to be a major independent operator in the industry. The company supplies its products to a range of restaurants and hotels but also supplies its products directly to the public from its from its central headquarters. The business traditionally uses e-commerce to facilitate electronic banking functions such as bill payment, payroll and bank transfers. The businesses accounting and inventory tracking system forms the major part of the business' information system. Recently the business has started to experiment with on-line orders and sales. A friend of the owners offered to develop a basic website that allows the ordering of goods on-line. Management encouraged the development of the e-commerce system to offer flexibility to existing and new customers. Pre-orders can be made through the website and pick-up and delivery can be arranged there after. It is hoped that the on-line system will provide convenience and potentially increase sales. The system has only been operating for a few months and it is too early to gauge its success. The costs of developing the system have been relatively minor and management will continue to support it in the near future. There is no integration of the on-line system with existing IS systems. This may change depending on the demand from the on-line market.

Case ID	Location	Age	Size	Industry
• R	• TAS	• 35	• 42	• Finance

This business provides a suite of financial reporting products assisting businesses to with debt recovery. Credit reporting of individual businesses and the production of a credit bulletin are central tasks for the business. The business also provides debt recovery services to complement the credit reporting functions. The majority of clients are located state-wide although there are a few customers located on mainland Australia. The business has branch offices in 4 major cites. The use of e-commerce is customer centric. E-commerce is used primarily as a strategic tool to improve organisational work flow and customer service by providing an on-line alternative to the lodgement of credit information and debt recovery details. A substantial investment in IT and e-commerce technologies were made to design, develop and host the e-commerce system.

The business has an in-house team of IT specialists that transformed existing information systems to cater for the e-commerce activities. External consultants were involved to design and develop the business's website and interface into the backend systems. The e-commerce interface has gained wide appeal from customers. In the first twelve months of operation with over 50,000 e-mails have passed through the e-mail server. The design of the e-commerce system was conducted with input from several valued customers. The implementation of e-commerce has provided an innovative alternative for clients transacting with the business, which offers a convenient service providing information that is

dynamically updated and live. The transformation within the business has been transparent but the benefits derived from e-commerce have been significant.

Case ID	Location	Age	Size	Industry
• S	• TAS	45	• 49	• Manufacturing

This company has been operating close to fifty years. The business is involved with the manufacturing of whole bakery products to a range of customers intrastate and interstate. The business supplies its products to small retailers as well as large supermarket chains. The business operates 24 hours a day six days a week. Traditionally IT has played a minor role in the operations of the business however the use of email now forms an integral part of the communication infrastructure in this organisation. Email is used exclusively throughout the organisation including the factory floor. Large corporate customers encouraged the use of on-line communications and electronic forms. Other customers are encouraged to communicate product orders via electronic forms attached to emails. The electronic orders are automatically integrated directly into the product system removing the chance of errors associated with manual order entries. The internal intranet system has significantly improved communications between management and its staff. This business is unique in that it operates 24 hours a day. Communications between factory managers and administrative staff on multiple work shifts are more streamlined. Directing customer service issues via email directly to the appropriate people in charge increases the level of customer service. Problems can be addressed quickly minimising the impact on the customer and the organisation. The use of e-commerce is specifically used internally and externally with the business' customers. The company's suppliers are reluctant to adopt e-commerce technologies but the business will continue to encourage the use of e-commerce. It is hoped that in the future more clients and suppliers will adopt e-commerce as this will further increase the benefits derived from e-commerce.

Case ID	Location	Age	Size	Industry
• T	• WA	• 4	• 1	• Retail

This business operates in a busy suburban shopping area. The shop sells cut flowers to individuals and businesses such as restaurants and accommodation providers. The owner employs two full time staff plus another part time staff member. The business has been established for over five years. The flowers are sourced from three main suppliers and are delivered daily. Orders are generated at the each afternoon and are generally faxed or phoned through to suppliers. E-commerce has been adopted to explore the potential for on-line sales and delivery of cut flowers. The owner's husband is a computer enthusiast and developed the site using web development software purchased on-line.

The website displays a range of floral arrangements and complimentary products for sale. The website enabled prospective customers to select the flower arrangement and associated products offered on-line. Details of the order, delivery information and credit card details can be entered on an electronic form found on the site. This information is collated into an e-mail, which is subsequently sent through to the shop. The staff at the flower shop dial-up to the Internet each

morning, noon and afternoon to gather any potential orders. Follow up e-mails or phone calls are made to check information.

The on-line service has been operational for over six months. On-line sales have been slow however the owner believes this will increase as more people use the Internet. The costs of establishing the site have been minimal and the use of e-commerce is largely seen as an experimental project. The costs to maintain the business' on-line presence is negligible and the owner intends on keeping the website going in the long term. The website is hosted via a local ISP. The information on the website needs few changes. The site does not offer any sophisticated security measures, the owner believes this has not deterred potential sales. The owner suggests that cautious customers have visited the site first and then phoned through order details. For a minor investment in e-commerce the owner believes that the potential for increase on-line sales will likely to increase in the future.

Case ID	Location	Age	Size	Industry
• U	• WA	• 5	• 2	• Education Services

This business offers a unique service for parents, primary and secondary school teachers. Case U provides a diagnostic and testing service to monitor the performance of children's attitudes and achievements in school. The business uses their website for primarily for marketing purposes. The tests are available for download and purchase on-line. The use of e-commerce supplements their existing marketing strategy. The cost of establishing and maintaining their website is cheap in comparison to advertising on the Yellow Pages®. Their core product is already stored digitally so to deliver it on-line is an easy task. The owners intend to maintain their web presence and believe that their use of e-commerce is effective and beneficial. No problems have been encountered in gaining their web presence.

Case ID	Location	Age	Size	Industry
• V	• WA	• 15	• 1	• Retail

Case V sells a range of craftware derived from native oils. The owners of the business market their product range to a local, national and international client base. There are few competitors in their industry that can produce similar high quality products. In their traditional value chain the business was generating a high turnover of products but associated costs with agents and administrators reduced the net profit margin significantly. By reducing their production and bypassing distributors and other agents the business has been able to reduce their product output by half but still retain the same level of net return. Their use of e-commerce provides an alternative transaction medium where customers can contact them directly for supply of their products. External developers initially developed the website however the owner feels confident enough to support and update the site by himself. The majority of orders for the products are conducted over the phone or via fax. A major problem did occur for six months when the website was down without any one noticing it. The owner concedes that this is a good reason to be able to self-edit their website. Although the site has been established for over three years the owner suggests that the website is not

economic yet but he does recognise that demand will increase and will continue to support it in the near future.

Case ID	Location	Age	Size	Industry
• W	• WA	• 2	• 4	• ICT Industry

Case W represents a small web development business that has been operating for two years. The business provides web development services with central database facilities. The vast majority of clients are SMEs. The owners indicate that when they started they had to educate their prospective clients about the potential benefits of e-commerce but now clients have a better idea about the Internet and e-commerce. The business offers a range of web development packages from static sites to fully integrated e-commerce systems. Approximately half of the clients sites have static web pages. The owners have found that costs associated with setting up a website is an issue for businesses however clients consider a basic static website is good value compared to the Yellow Pages® advertising. The range of knowledge, experience and IT capabilities varies considerable amongst the clients and this potentially makes it difficult to satisfy the requirements requested by clients. The business operates in a highly competitive industry but fortunately they have established a solid client base. It is envisaged that the business may expand into other international locations in Malaysia and Singapore.

Case ID	Location	Age	Size	Industry
• X	• WA	• 1	• 2	• Education Services

This is a unique business with few competitors. The business provides teachers with worksheets used in the classroom. Traditionally teachers have purchased workbooks with numerous worksheets enclosed. Teachers often only use a small percentage of worksheets from each workbook. The Internet has enabled this business to establish a new global venture, which provides teachers with the ability to download a variety of worksheets as required. A database of worksheets is located at the web-site. Registered users can download these worksheets for a fraction of the cost of such sheets at traditional retail outlets.

The web has provided a means for this business to promote their product globally in a cost-effective manner. Daily input from the owners is not essential. Answering queries and updating the worksheet database are the main tasks involved in operating this business. The original database of worksheets was already established in electronic format and hence the creation of this virtual business was very cheap and simple. The alignment of a virtual business strategy fully compliments the existing traditional business structure.

This virtual business model requires minimal resources to run and on-going running costs are very low. The product is cheaper to purchase, more accessible and internationally available. Costs savings have been realised as a result of lower production costs and administration costs. The virtual business application was developed in-house. The application facilitates the process of teacher registration,

product ordering and delivery. The current application requires little maintenance and is fully automated. The business has customers both nationally and overseas. The business has no desire to initiate partnerships or alliances with any other firm however the owners are considering adding other links to products or services that would add value to their web- site.

This business reflects the potential high degree of virtual-ness for small businesses. This business initially started with three full time employees. They were in-charge of application development and marketing of the product. The business basically operates automatically. Answering the occasional query is all that is required and this can be directed automatically to the most available person at the time. The process or registration, transfer of product and receipting of the product is totally automated. The product is highly appropriate for a web-based business.

Case ID	Location	Age	Size	Industry
• Y	• WA	• 1	• 2	• Retail

Case Y is a retail shop that sells a range of products to a niche market. Until the advent of the Internet the business idea was not a viable proposition. The accessibility and convenience of selling on-line to a global audience initiated the establishment of the business. The business relies solely on the Internet to market and sell their product range. The owner and his wife operate the business. The enthusiastic business owner taught himself some basic web development skills and the business' website. The site has been operation for less than a year and they have sole several items. The business is deemed an experiment and they will continue to support the business idea for a few more months before they review its viability. Currently they have not found another website like theirs. The ISP hosting the site provides a secure transaction system, which is offers a high level of security but is easy to manage from the vendor's point of view. The business initially conducted a mail order scheme to get a feel for the potential demand of products. The mail order trail cost $6000 to initiate but only returned less than 1% in sales. The website has received similar sales figures without the administration and marketing costs. The website has not been marketing by the business. The owners of the business have no regrets and find the e-commerce business concept "fascinating". They intend to use the knowledge gained from their e-commerce venture for other business projects.

Case ID	Location	Age	Size	Industry
• Z	• WA	• 3	• 12	• IT Industry

Case Z is a small web development business operating in Perth. The business was established in 1996. A main office is located in Perth with a second office located in Sydney. The business finds the cost of operating the business in Perth is more affordable than operating in Sydney. This allows the business to be price competitive with other competitors located on the East Coast of Australia. The business possess clients in every State of Australia although they have not met many of them. They have found that the demand for their work has grown dramatically in the past eighteen months prior to the interview. They use their business website to showcase their skills and find that "word of mouth" advertising works well for them. Clients that approach them for their services often have no e-commerce strategy however the calibre of clients attracted to their

business want integrated solutions or systems to improve customer service reducing the costs of transactions. They haven't encountered too many problems with clients and feel that clients are becoming more knowledgable about e-commerce.

Case ID	Location	Age	Size	Industry
• AA	• WA	• 1	• 8	• Retail

Case AA represents an existing business that sells a range of office products. The potential of the Internet and e-commerce has attracted the owners of this business to establish an on-line sales presence. It is hope that the website will expand the range of existing clients. The e-commerce system has been developed externally by a local web development firm. The site is hosted and maintained by the web development firm. The owners have no knowledge or experience with web development but believe that there exists a potentially lucrative on-line market. Currently the business is in favour of servicing the local market place however they have received orders from regional locations. The business does service the regional community but prefers to cater to businesses close to the CBD. Orders from rural and interstate customers are more difficult to process consequently are not generally desired. Due to a lack of IT skills and staff the business has found it difficult and expensive to update the website. The on-line business has not been operating as well as expected and the owners are unsure if they will continue to maintain an Internet presence in the future.

Case ID	Location	Age	Size	Industry
• AC	• WA	• 7	• 45	• Wholesale

This business was established in 1992. It started with two people and now employs forty-five staff nationally. The business wholesales a range of telecommunication accessories. The business initially gained a static web presence but have initiated a plan to change their e-commerce focus to include a product information and order entry system exclusively aimed at their network of distributors and resellers. The main hurdle is to encourage retailers to use an alternative communication path other than phone and fax. The new system aims to provide a total integrated solution joining existing accounting and IS systems with a web-based interface. Currently the business uses fax a pro-forma with their suppliers. The suppliers are not encouraging the use of e-commerce however the business is trying to gain support for email communications. The business owners have an interest in IT and fix most IT problems themselves. Any difficult IT problems are out-sourced externally.

Case ID	Location	Age	Size	Industry
• AD	• WA	• 6	• 45	• IT Industry

The company is a major web consultancy located in Western Australia. The company provides web development services and application development services to the corporate sector. The clients that approach the company typically want a total e-commerce solution. Their clients are well informed and know the potential for e-commerce. The business agrees that the ICT industry is in its infancy and acknowledges that there are numerous competitors in smaller ICT

businesses however this organisation is fortunate enough to have limited local competitors. The business has successfully completed contracts in North America and Europe. They find themselves extremely competitive in the global market place for their services. The international clients have been attracted to the business from recommendations of past clients. The costs of development are lower than those quotes by firms located in Sydney and in North America. Problems that have arisen in dealings with clients relate to the ownership and maintenance of websites. Often clients that don't have internal staff that are capable of supporting their e-commerce ventures find it expensive and difficult to make ongoing changes. The largest problems relate to clients that compromise on costs and infrastructure and don't possess a long-term strategy for their use of e-commerce and the Internet.

Case ID	Location	Age	Size	Industry
• AE	• WA	• 5	• 21	• Agricultural

Case AE is a non-profit organisation that provides essential agricultural industry information to a wide range of primary producers. The business has been in operation for over twenty years. At the time of the interview the business maintained a client base of 15,000 members. The business has branch offices in Perth, Wagga Wagga and Toowomba. Members have access rights to a central database, which is available to on-line members twenty-four hours a day. Historically information was mailed out however the number of members using the on-line system has dramatically increased. Information is sourced electronically and it requires little manipulation to store the information for retrieval. The organisation hosts it's own website and has a small number of IT staff. Management was initially sceptical of the use of e-commerce and the Internet but have since acknowledged the value of their website. E-commerce has brought increased efficiencies and lower production and delivery costs.

Case ID	Location	Age	Size	Industry
• AG	• WA	• 2	• 4	• IT Industry

This business is a web development business that was established as a separate division of a graphic design and marketing company. The business compliments the range of services provided by the other associated businesses. The business does not host its clients' websites but maintains a working relationship with another ISP. The majority of clients are SMEs that either request the developments of static websites or interactive sites that are linked to conventional "bricks and mortar" type businesses. This business has experienced the lack of strategy and planning by clients when they embark on an e-commerce venture. This often creates problems during the design and implementation of the systems. However as with other web developers the owners/managers of the SMEs are becoming more aware of the technologies and potential benefits associated with e-commerce.

Case ID	Location	Age	Size	Industry
• AH	• WA	• 6	• 2	• Retail

This business operates from the rear of a house in Perth, Australia. A husband and wife team established the business six years ago. Initially this on-line bookshop catered for a wide range of subject areas however in recent years the business has

found selling books in niche areas to be more profitable. Geographically the customer base is global with sales distributed evenly between Australia and the international market. A local ISP developed the e-commerce application in-conjunction with the owners of the business. The owners of the business primarily conduct the management and support of the web-site.

Major changes to the business's website are carried out by an external ISP. Orders are predominantly received via email or fax. Payments for the books are generally made with credit cards or electronic funds transfer. To date, the business has experienced some fraudulent activities with credit payments, where purchases were made with bogus credit card details. As a consequence extra precautions are in place to reduce the risk of further payment fraud. The business operates in a highly competitive international web based bookshop market.

There are no plans to form any strategic alliances with other bookshops or complimentary service providers. The owners of the business have found that the personal contact with existing and new customers is a major component to the successful operation of their business. Unlike traditional bookshops where the consumers are often anonymous, many of the company's customers are repeat purchasers. The on-line trading medium enables the business to identify their customers and consequently provide an avenue to develop marketing plans aimed directly at customer profiles.

The business is run in a virtual environment and there is no requirement for a fixed commercial address. There are plans to move the business to a warehouse premise if demand for stock increases. The location of a new premise would not affect the operation of the business. Traditionally the margins on book sales in a retail environment are small. Operating a bookstore on-line further reduces these margins because on-line customers expect discounted prices. Any cost reductions made from operating in a non-retail premise are offset by the discounts expected by on-line customers.

Case ID	Location	Age	Size	Industry
• AI	• WA	• 10	• 2	• Retail

Case AI has been operating for over ten years selling a range of entertainment products. The owners of the business decided to explore the possibility of selling their products on-line. The wife and son of the owner developed the website over a period of six weeks. They business targets its customers locally and within their State. So far they have received orders across the State and some interstate. Six ISPs were approached before a suitable hosting agent could be found. The lack of a guaranteed connection and accessibility presented the most concern. Previously most of the communications with suppliers have been over the phone or fax but now many have on-line trading systems that allow payment by credit card. The ability to trade on-line with suppliers is more convenient and requires less bookkeeping functions as the credit card and email receipts provide a sound audit trail for account reconciliations. The business considers itself to be market leaders and continually generate new initiatives. The website has costs have been minimised due to the internal development of their e-commerce system. The e-commerce venture has "sharpen" the development of their business and their

future. If the e-commerce transactions increase significantly the owners may consider using non-retail storage space which will reduce costs further.

Case ID	Location	Age	Size	Industry
• AJ	• WA	• 4	• 4	• Retail

Case AJ is a specialist independent bookshop that retails a range of books and associated products to a highly specialised niche market. The focus of their on-line bookshop is to primarily service customers located around Australia. The establishment of an on-line trading site was increased the amount of work for the bookshop however the business is not seeking international orders as the work required to address such orders is more involved than local on-line sales. The costs of setting up the e-commerce application have been significant, as external consultants have conducted all development. The business believes that their relative success of selling products on-line can be attributed to the unique niche market, which they cater for and the lack of other on-line trading sites within Australia. The busiest time of the year for on-line sales is the months prior to Christmas. The supplies of their products from wholesalers are still conducted via phone and fax. The business believes that it is highly unlikely that the wholesalers will offer an on-line ordering system in the near future. The owner of the business has no prior IT background but can appreciates the value of e-commerce. He believes been pro-active in the use of e-commerce has achieved some competitive advantage however the e-commerce experience has been a steep learning curve. The business has been required to completely update their existing IT infrastructure. The initial costs of establishing the e-commerce system has been significant but ongoing costs to maintain the e-commerce application will be relatively inexpensive. The e-commerce system is not integrated into other IS systems but this may be a consideration in the future.

Case ID	Location	Age	Size	Industry
• AK	• WA	• 2	• 4	• IT Industry

Case AK is a small web development business located in Western Australia. The firm offers a range of e-commerce services to local SMEs located within the CBD and surrounding suburbs. The business has the capability of operating from a remote location but maintains a commercial address to service its customers. The business historically provided IT support services to its clients and has progressed to offer web development services. The relative success of some of their websites has surprised their clients and themselves. The ability to provide a total integrated IT and e-commerce solution has increased the business chance of acquiring new clients. The cost involved with developing an e-commerce application is a concern for clients and most clients prefer a fixed quote to complete the system. Clients are readily looking at avenues to increase market share while reducing the costs of servicing their clients. Most clients don't have an e-commerce strategy and require the service from the business to make an appraisal of the potential benefits from e-commerce. Although this business has been operating for a few years the demand in their services has increased progressively over the past twelve months at the time of the interview.

A Summary of characteristics of each case study utilised in this research.

	Case	Case Code	Industry	SME	EC Application	EC Benefit
1	Rural Producer	A	Agriculture	Micro	Electronic Publishing	Reduced publishing costs
2	Scientific Systems	B	Fishing	Micro	Communications, Product Demos	marketing, mobile working
3	Restaurant	C	Hospitality	Micro	Online lunch and catering menu	enhanced customer service
4	Software Distributor	D	Retail Trade	Small	Product Demonstration	Global reach, efficient info. systems
5	Clothing Distributor	E	Wholesale Trade	Small	Customer Information system	Customer service, customer loyalty
6	Hotel	F	Hospitality	Small	Basic Online bookings	online booking, marketing
7	Fruit tree grower	G	Agriculture	Micro	On-line Sales	Disintermediation
8	Web Developer	H	Communications	Small	ISP	production efficiencies
9	Manufacturer	I	Mining	Med	Global Intranet	Global reach, customer service
10	Manufacturer	J	Manufacturing	Small	On-line Sales, Electronic banking	Global reach, sales
11	Insurance Adjuster	K	Insurance	Small	Customer Information System	Better communication efficiencies
12	Web Developer	L	Communications	Micro	ISP	Production efficiencies
13	Rural Producer	N	Agriculture	Small	Accounting Information System	reduced operational costs
14	Bakery	O	Retail	Med	Franchise Information System	Administration efficiencies
15	Fish Farmer	P	Fishing	Med	On-line Marketing	Reduced marketing and costs
16	Grocery Store	Q	Retail Trade	Med	On-line Sales	Extra sales
17	Financial Service Provider	R	Business Services	Med	Customer Information System	Enhanced customer service
18	Food product Manufacturer	S	Manufacturing	Med	Supply Chain Management System	Production efficiencies
19	Flower shop	T	Retail Trade	Micro	On-line Sales	Extra sales revenue, marketing
20	On-line Education Service	U	Education	Micro	On-line education provider	Fully automated business
21	Craft Shop	V	Manufacturing	Micro	On-line Sales	Global reach, sales
22	Web Developer	W	Communications	Micro	ISP	Production efficiencies
23	Educational Service Provider	X	Education	Micro	Marketing, On-line Sales	Global reach, marketing
24	Retail Shop	Y	Retail Trade	Micro	On-line Sales	Extra sales
25	Web Developer	Z	Communications	Small	ISP	Production efficiencies
26	Stationery Supplier	AA	Retail Trade	Small	On-line Sales	National reach
27	Communication products	AC	Wholesale Trade	Med	Supply chain management system	Supply chain efficiencies
28	Web Developer	AD	Communications	Med	ISP	Production efficiencies
29	Agricultural Advice Services	AE	Agriculture	Small	Information dissemination	Cost effective communication
30	ISP	AG	Communications	Micro	ISP	Production efficiencies
31	On-line Retail Shop	AH	Retail Trade	Micro	On-line Sales	Disintermediation
32	Retail Shop	AI	Retail Trade	Micro	On-line Sales	Global reach, sales
33	Retail Shop	AJ	Retail Trade	Micro	On-line Sales	Global reach, sales
34	ISP	AK	Communications	Micro	ISP	Production efficiencies

* Three cases wished to be removed from the study (See section 3.3.4.1.).